

# BLUE BOOK

SERVING THE METAL WORKING INDUSTRY SINCE 1906



A HITCHCOCK PUBLICATION



This is another of the  
"HUNDREDS OF JOBS"  
which can be done on a  
**MARVEL Band Saw!**

**MARVEL BAND SAW saved these  
two 4400 lb. castings**

Two sand cores washed out when these giant 4400 pound steel connecting rods were cast, resulting in solid eye ends without gaps. Then came the \$64 question—how to machine out the 11½" slots in the longitudinal center of the eyes which were 22" high and had a wall thickness of 6½".

The Ernest J. Nelson Iron Works of San Francisco, did this "impossible" job easily, quickly and economically, without special tooling, on a standard Model No. 8M 2 MARVEL Band Saw. Two cuts were made in each rod in two hours per cut with tool cost of \$3.06 per rod. The tool was a MARVEL B9-10 Band Saw Blade.

Every tool room, machine shop and maintenance department needs a MARVEL Series 8 Universal Band Saw—not only for innumerable everyday jobs but for the occasional "trick" operations, where its utmost versatility will save many headaches and dollars.

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5700 Bloomingdale Ave., Chicago 39, Illinois



*These exclusive MARVEL  
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1. Large, T-slotted work table.
2. Blade feeds into work vertically;  
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4. Automatic blade tension.
5. Built-in coolant system.
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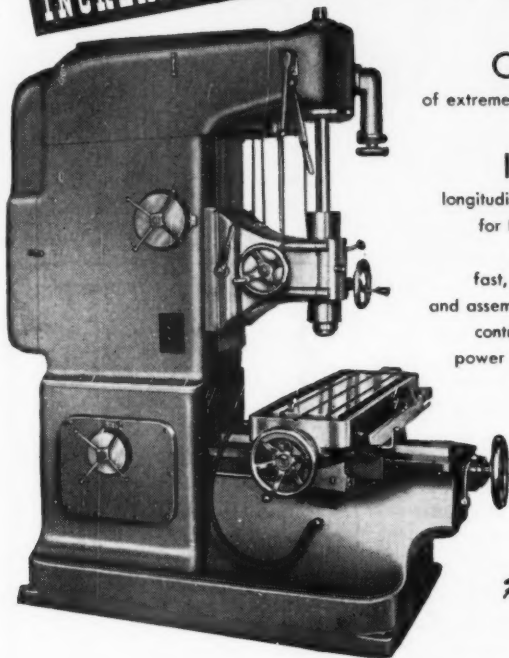
Eliminate Extra Setup Time

REDUCE UNIT COSTS

Save Unnecessary Work Transfers

INCREASE PRODUCTIVE TIME

## No. 50 PRECISION BORING AND VERTICAL MILLING MACHINE



Combined in a single solid-base machine of extreme capacity — every feature for precision boring and accurate milling!

In the No. 50 are exceptional cross and longitudinal table travel plus long spindle travel for handling an extensive range of work — rugged, rigid bed-type construction for fast, heavy cutting — precision manufactured and assembled for positive accuracy — convenient controls for easy, effortless operation — and power to spare for the heaviest, toughest jobs.

With far greater range than other machines of comparable size, the No. 50 is an assured investment in reduced costs and more profitable production.

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W. B. KNIGHT MACHINERY CO., 3920 West Pine, St. Louis 8, Mo.  
We would like to have your catalog on the No. 50 and other Knight Milling Machines.

Name

Title

**MORE GOODS for MORE PEOPLE at LOWER COST**

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# SINK DRAIN-TRAP BENDS PRODUCED

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### WITH PINES *Automatic* BENDING MACHINE

180° Bends in 1½" Brass Tubing  
Produced at Rate of 400-500 Per Hour

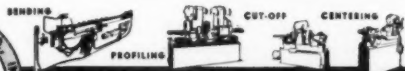
This Pines Size ¾ Automatic Bending Machine, employed by a plumbing fixture manufacturer, has increased production of sink drain traps 250% over former methods, and reduced tool maintenance costs 50%. Between 400 and 500 180-degree bends per hour are produced in 1½" brass tubing of .032" wall. The radius of the bend to center line is 15⅝". Prior production was less than 170 bends per hour.

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Learn how Pines production bending equipment can help you save time and cut costs. Ask Pines engineers to submit recommendations.

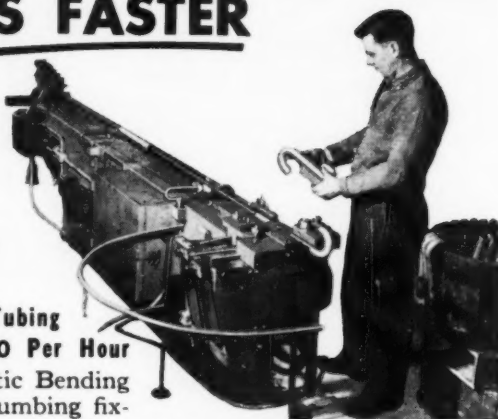


**PINES** ENGINEERING CO., Inc.

*Specialists in Tube Fabricating Equipment*

692 WALNUT

AURORA, ILLINOIS

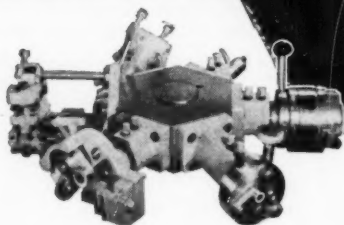
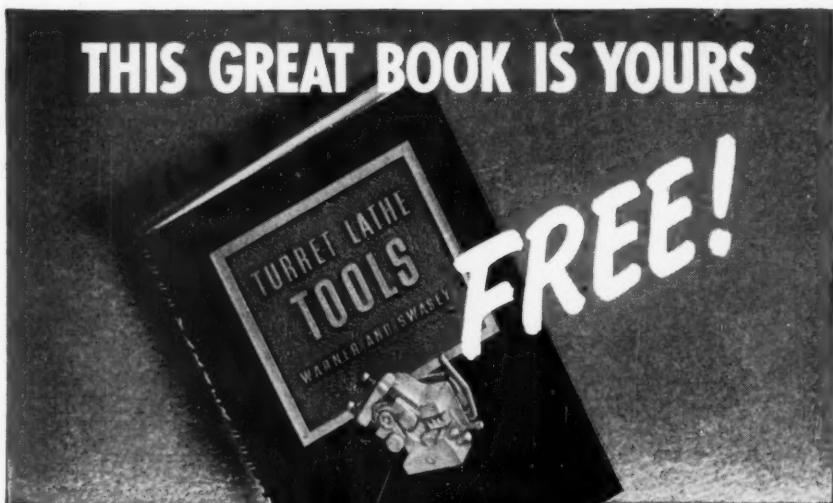


#### COST-SAVING FEATURES

- Produces Accurate, Uniform Bends without wrinkles or distortion.
- Faster operating—saves time, cuts costs.
- Pushbutton Control—easy for one man to operate.
- Highly Versatile—handles wide variety of work including serpentine, stacked coil, compound, and multiple bends.
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Faster, for Less...with  
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Warner & Swasey standard turret lathe tools, and Universal Tooling Setups, can increase *your* production as they have in many other shops. Write today for the 184-page book, "Turret Lathe Tools" which clearly and simply explains Universal Tooling principles for bar and chucking work, combined and multiple cuts, and applications of modern tooling. Use this handy coupon!

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### for every operation!

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These permanent multi-purpose tools can be picked up as needed from your industrial distributor. Use them wherever possible to increase number of pieces per hour, to lower cost per piece.

Write for our New S-48 Catalog.

**ARMSTRONG BROS. TOOL CO.**

"The Tool Holder People"

5208 W. Armstrong Ave., Chicago 30, Illinois



DECEMBER, 1949

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Without obligation, please send us a free sample kit of one tube of CMD Center Point Lube and one tube of CMD Center Point Oil. Also, send Catalog describing CMD Helical Groove Centers.

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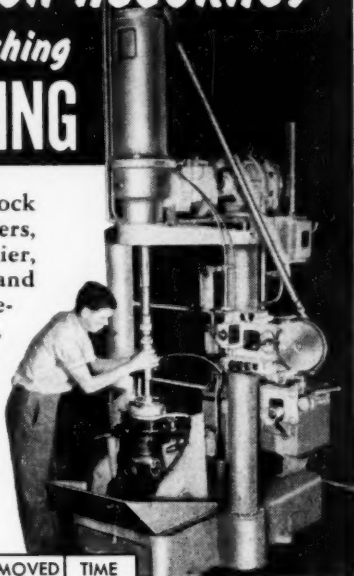


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**CHECK THESE TYPICAL PRODUCTION  
EXAMPLES OF FAST STOCK REMOVAL  
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PIECE	LENGTH	DIAMETER	STOCK REMOVED	TIME
Hardened Pump Liner	27"	7.250" $\pm .0005$ "	.015"—.018"	10 min.
Forged Gear Blank	Two 6" Bores	4.250" $\pm .0002$ "	.005"	1 min.
Chrome Plated Diesel Liner	32"	8.500" $\pm .0005$ "	.004"—.006" of chrome	3 min.



(Above) Fulmer Model 10-25, honing  $5\frac{3}{4}$ " bore aircraft cylinder, removing .006" of stock. Rate: 24 cyl. per hour.

**FULMER COMPANY NOW EXCLUSIVE U. S. DISTRIBUTOR FOR  
ALEXANDER BALL HONING TOOLS**

Available in sizes from  $\frac{1}{2}$ " to 50" diam.



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...THERE'S A CINCINNATI  
ACCESSORY

FOR THE  
JOB

Cincinnati offers a wide selection of high-quality milling machine accessories, designed to facilitate any type of operation. A few of them are illustrated here. All are manufactured to the highest standards of quality. Arbor collars, for example, are hardened; the ends are ground and lapped to assure squareness.

¶ An attractive 24-page catalog contains tabulations of all sizes and styles of CINCINNATI Milling Machine Arbors and Accessories. One section, devoted to "How to Handle, Store, and Use Arbors" is of interest to everyone concerned with the operation of milling machines. A copy of this informative catalog is yours for the asking.



Publication No.  
M-1664.



## THE CINCINNATI MILLING

CINCINNATI 9.

MILLING MACHINES • BROACHING MACHINES  
FLAME HARDENING MACHINES • OPTICAL PROJECTION



ARBOR—STYLE B  
13 sizes and lengths—30 Series  
10 sizes and lengths—40 Series



QUICK CHANGE  
FACE MILL ARBOR



SPRING CHUCKS AND COLLETS  
11 sizes of collets from  $\frac{1}{8}$ " to 1"



QUICK CHANGE COLLETS



COLLET ADAPTER  
No. 30 to No. 40 Series



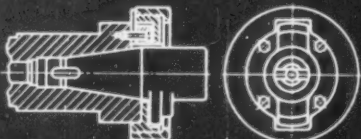
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END MILL ARBORS



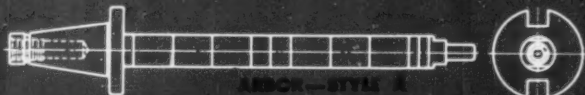
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# Can you take advantage of this **REAL ECONOMY?**

**THIS  
2"  
TURRET  
LATHE**

## **GISHOLT No. 4 UNIVERSAL RAM TYPE TURRET LATHE**

You don't have to invest in expensive heavy-duty lathes to handle large diameter work of this nature. Here is the ideal lathe to machine tubing, plastics, or lightweight bar stock such as aluminum. You can use it for softer metals like brass, too.

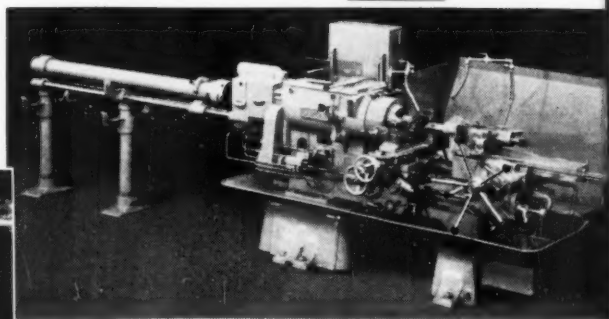
The Gisholt No. 4 Ram-Type Turret Lathe (normally 2" bar capacity) can be furnished with a larger spindle bore providing  $4\frac{1}{2}$ " round collet capacity. This machine gives you all the modern operating advantages which mean high speed production and low costs. It may be the economical solution to your problem. Ask your nearest Gisholt representative about it. Or write us for complete information.

**GISHOLT MACHINE COMPANY**

*Madison 10, Wisconsin*

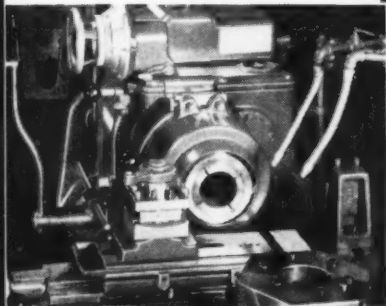


**COLLET CAPACITY  
for tubing, plastics and  
lightweight bar stock**



The Gisholt No. 4 Ram-Type Turret Lathe with  $4\frac{1}{2}$ " round collet capacity and equipped with  $4\frac{1}{2}$ " bar feed. (At left) Close-up view of  $4\frac{1}{2}$ " capacity collet chuck. This machine is ideal for large diameter tubing.

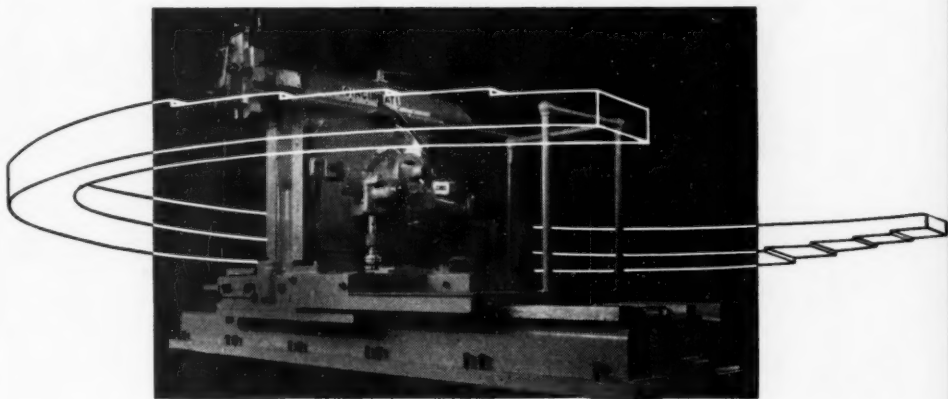
THE GISHOLT ROUND TABLE represents the collective experience of specialists in machining, surface-finishing and balancing of round and partly round parts. Your problems are well-come here.



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# 8 ft. OF CROSS FEED

## ON THIS CINCINNATI SHAPER



**ONE SETUP SAVES TIME.** Seven feet at end of 20-foot diameter cast steel generator half rings is machined with one setup as shown in schematic sketch above.

**NEW!** This new Cincinnati Traveling Shaper accurately machines surfaces requiring eight feet of table travel—with one setup.

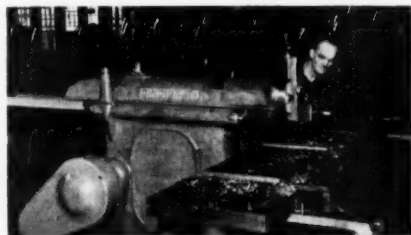
The operator rides with the machine so controls are always at hand. Accurate settings can be made easily at any point of travel with the vernier.

**NEW ECONOMIES!** This Cincinnati Traveling Shaper is effecting real economies for a large manufacturer of motor generators.

Steps are machined over a seven-foot length on the ends of seven-ton generator rings 20 feet in diameter. This one setup greatly reduces machining time on this otherwise awkward job.

**NEW FIELDS!** This application of powerful Cincinnati Shapers opens up new fields of use in the machining of long, interrupted surfaces on very large work.

Investigate the possibilities for you in this new Shaper development. Our Engineering Department will be glad to cooperate.



**MANY APPLICATIONS,** such as shaping slots in eight-foot table, are performed quickly and economically with a Cincinnati Traveling Shaper.

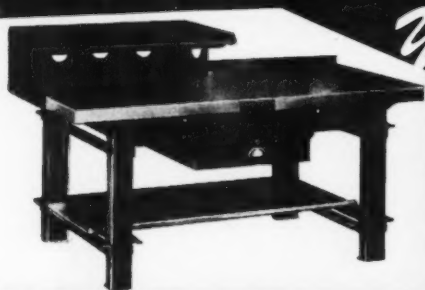
*Write for the new Shaper Catalog—S-5.*

**THE CINCINNATI SHAPER CO.**

CINCINNATI 25, OHIO U.S.A.  
SHAPERS - SHEARS - BRAKES



# PRECISION BUILT!



*Yes.* **CHALLENGE**  
**WORK BENCHES**  
*are Precision Built.*  
They are not of the  
Hammer-and-Saw Variety

Accurate work requires an *always smooth*, level, unyielding Work Bench. A Challenge Bench gives you all this.

● The rugged, two inch, cast iron top is carefully machined on top and on *all four* edges at right angles. You can depend on their accuracy.

● The top is supported on sturdy steel channel legs welded into a rigid framework by cross angles. The long channel supports are provided with lock leveling screws by which the top can be kept perfectly level at all times. The lower braces are high enough above floor to permit moving by standard lift truck.

● Tool box shelf at one corner gives added capacity as do the steel drawer and full length shelf below top. Drawer has pilfer-proof lock.

● Built in four standard sizes 28 inches wide and 48, 60, 72, and 84 inches long in three styles (1) complete as illustrated, (2) with tool box shelf and without drawer, or (3) without tool box shelf or drawer.

WRITE for Complete Catalog of Challenge Precision Equipment. Including Layout Surface Plates, Bench Plates, Lapping Plates, Straight Edges, V-Blocks, Right Angle Irons and Angle Plates.



see



**THE CHALLENGE MACHINERY CO.**

GRAND HAVEN, MICHIGAN, U.S.A.



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**SKIL Drills**  
the best drills for  
your toughest jobs!

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**Extra Powerful Motors** . . . Statically and dynamically balanced for finest performance.

**Smooth-Running Gears** . . . Precision-cut helical gears transmit full power smoothly and quietly.

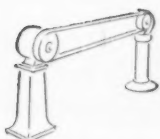
**Finest Bearings** . . . Highest quality—chosen especially for long life and vibration-free operation.

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## BACKSTAND-BELT GRINDING INCREASES PRODUCTION IN POLISHING AND FINISHING

The coated abrasive belt used in conjunction with contact wheel today is established as an efficient production tool. For grinding, polishing and finishing hundreds of consumer and industrial items, the backstand-belt method today has been proved much more efficient and economical than has the old set-up wheel method.

### Five Advantages

Manufacturers who have switched from the set-up wheel method point to five distinct advantages of the backstand-belt

method over the set-up wheel . . .

- An abrasive belt is a scientifically made tool, manufactured under controlled atmosphere conditions by experts utilizing modern making equipment. The photomicrographs compare the crude, uncontrollable rolled-on cutting surface of typical set-up wheel (A) with the coating on an Armour Abrasive Belt (B). Note how the sharp cutting points on the factory-coated belt are exposed to provide faster, cleaner cutting action—increased production.



A



B

- The coated abrasive belt cuts cooler because of the longer interval between work contacts.
- Inexperienced help can be quickly trained to operate a backstand-belt machine. Skilled personnel needed to dress set-up wheels can be used elsewhere.
- It takes only a few seconds to change an abrasive belt.
- The temperature-controlled room used for curing set-up wheels can be released for other more productive uses.

### Actual Case History

The W. L. and Metals Company used a hard, set-up polishing wheel on aluminum sand castings for aircraft and transportation industries. The wheels had to be inspected constantly for out-of roundness.

When the company changed to the backstand-belt method, removing gates and fins from castings was no longer a drawback to production. With this new method abrasive costs were lower and the finish much better. The entire operation was speeded up 50-60%.

It will pay you to investigate the modern backstand-belt method. Write today to the Coated Abrasives Division, Armour and Company, North Benton Road, Alliance, Ohio, for the booklet — "Facts about Backstand-Belt Grinding and Polishing."

## Need Coated Abrasives? Call Armour!

Backstand belts are only one item in Armour's complete line of coated abrasives. Alundum, Garalun, Garnet and Crystolon come in rolls of paper, cloth or combination . . . in sheets for hand sanding in belts, discs, and other specialized forms.

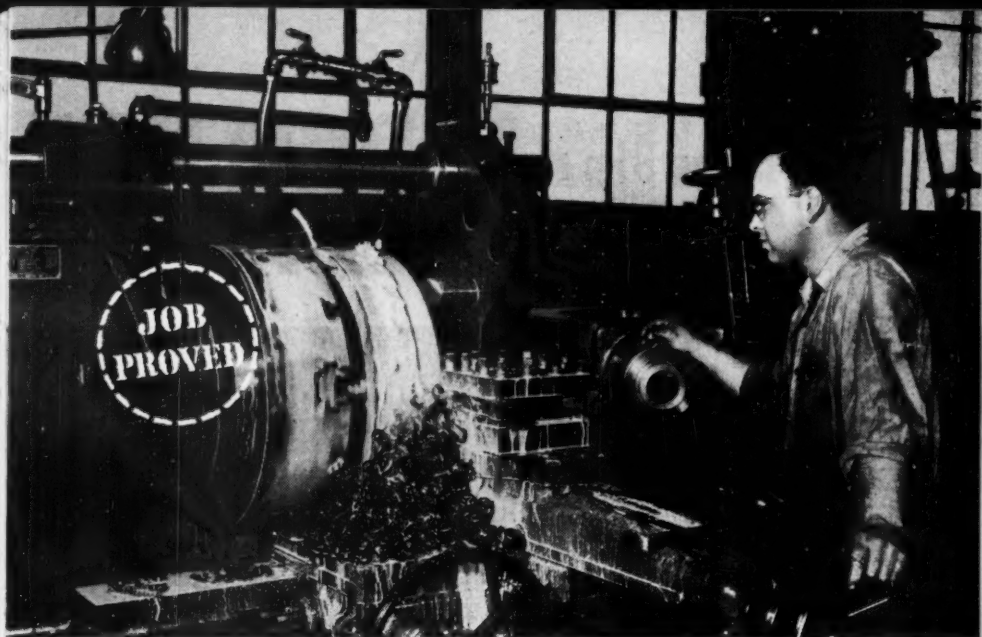
Whatever your products or specialized needs . . . one of Armour's complete line of metal-working abrasives is *right* for you.

We recommend buying through your  
Industrial Distributor.

**ARMOUR**

*Coated Abrasives*

Armour and Company  
North Benton Road, Alliance, Ohio



## S.E.C.O. BEATS COSTLIER CUTTING OIL

**Competitive Product Fails to Match Fine Record of  
Sunoco Emulsifying Cutting Oil in Cost or Performance**

For 27 years a metalworking shop used Sunoco Emulsifying Cutting Oil with complete satisfaction. Tool life was excellent and machines stayed clean. High production, with minimum scrap, was the rule year in and year out.

The following is typical of the difficult operations in which the Sun product was successful for so long.

**Machine:** Gisholt turret lathe, model 4L.

**Part:** 20" press mold shell 22 $\frac{3}{4}$ " O.D. x 6" wide x 20 $\frac{1}{4}$ " I.D.

**Operation:** Turning and boring rough forgings.

**Materials:** 40-50 carbon steel.

**Tools:** Firthite carbide tools.

**Feed:** .012 at 31 rpm.

**Cut:**  $\frac{1}{8}$ " to  $\frac{3}{4}$ " on O.D. and boring.

Two years ago the shop was persuaded to try a competitive oil on the above opera-

tion. Test results showed that the competitive oil, costing three times as much, lacked stability. Performance was far inferior to that of Sunoco Emulsifying Cutting Oil in regard to tool life and quality of finish. The company was convinced the original choice had been sound.

In all machine shop operations, on both ferrous and nonferrous metals, you'll find Sunoco Emulsifying Cutting Oil and Sunicut straight cutting oils of real assistance. They help maintain production schedules, lengthen tool life, and keep operating costs down. For a free Sun cutting oil recommendation card, write Dept. M.T.-12

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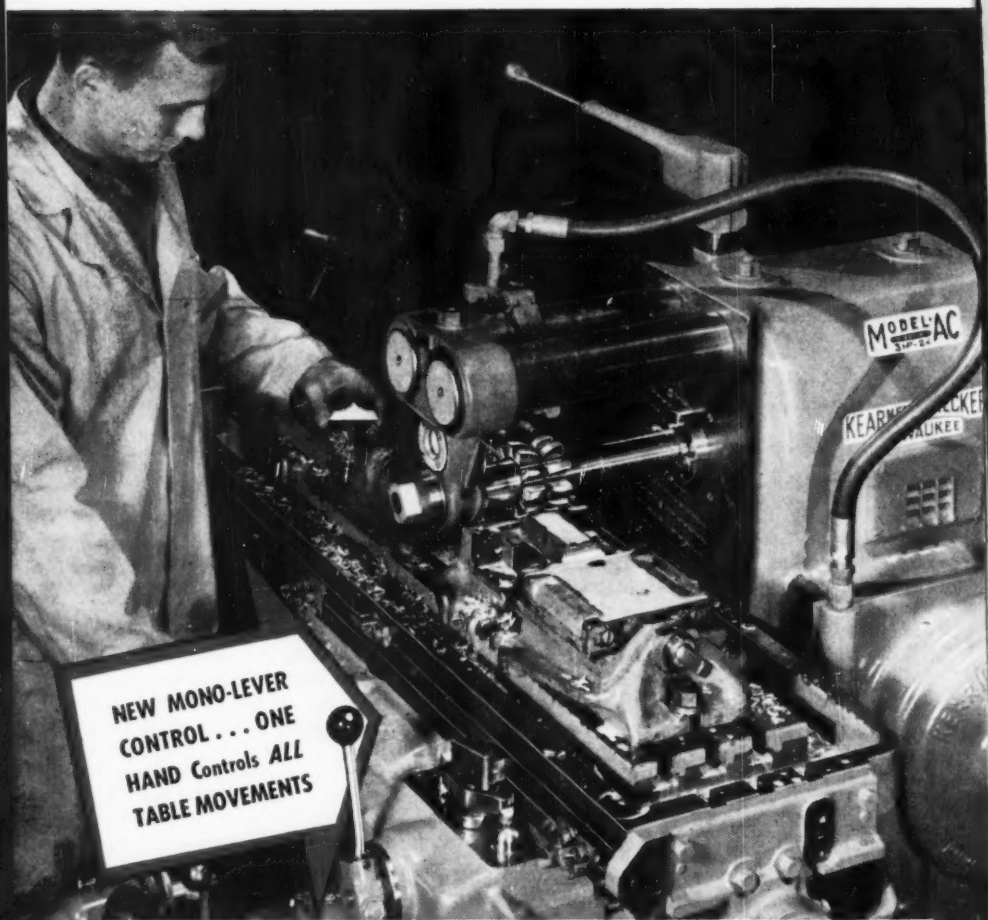
*Toronto and Montreal*

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**"JOB PROVED" IN EVERY INDUSTRY**



# Now in the 3hp range.. **FOUR NEW MACHINES FEATURING**



**NEW MONO-LEVER  
CONTROL . . . ONE  
HAND Controls ALL  
TABLE MOVEMENTS**

Camera study of good management at work! The job — form mill two radii on medium steel wedge plates. Fine finish required. With new Kearney & Trecker 3 hp Model 24-AC machine, operator sets up automatic table

cycle for reciprocal milling and easily paces production using climb and conventional milling alternately. **RESULT:** 28% savings in loading time, reduced scrap, more uniformity, less operator fatigue.

# KNEE-TYPE MILLING MONO-LEVER CONTROL

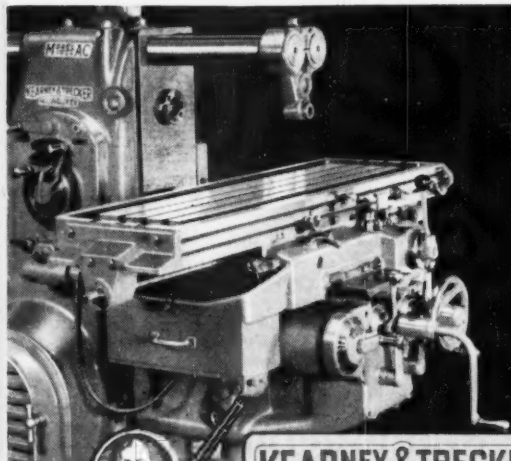
**Y**OU asked for them — Kearney & Trecker milling machines in the 3 hp range with Mono-Lever Control and Automatic Table Cycle. Here they are — your choice of two different styles, plain or vertical with either 18" or 24" table feed.

These machines offer you features never before available on machines of this size and type: 33% larger table working area plus built-in deep-well coolant troughs all around — extra large (2" dia.) precision-ground table screw with adjustable nut to eliminate backlash — drawer-type chip containers for easy chip removal — positive metered lubrication of the saddle and table ways and table feed mechanism — six-way power rapid traverse — automatic spindle stop — and quick-change feed and speed selection.

Don't wait. It costs you nothing to find out today about these new machines. See how they can meet all around big or small job requirements in your shop. For detailed information call our nearest representative or write direct to Kearney & Trecker Corporation, 6784 West National Ave., Milwaukee 14, Wis.

You get 33% more table working area on these new machines — 38" x 14" on Model 18-AC and 44" x 14" on Model 24-AC. This means greater adaptability to handle more jobs.

New 3 hp Model 24-AC plain style Kearney & Trecker milling machine featuring Mono-Lever Control and Automatic Table Cycle . . . ask about it or the vertical style equivalent today!

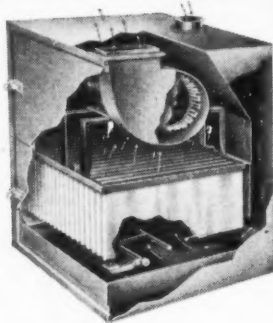


**KEARNEY & TRECKER**  
**MILWAUKEE**  
**MACHINE TOOLS**

## EASY TO SOLVE

### The Clock Card Trick

*Arrange any number of cards so they form a clock and pendulum. Have someone secretly select a number. Tell him how to count around clock. You leave the room, but you know the card no matter what the number he selects, and can call it out. Write us for Clock Card Trick solution. It's free, of course.*



### How Torit Dust Collectors Work

Dust laden air, from hoods surrounding grinding or polishing wheels, passes down through the compartment at the right, and then up through the filters. Heavy particles fall into the tray, while the finer dust adheres to the *outside* of the filters. No dust is trapped *inside* them, so they are easily kept in a clean operating condition. Filtered air then passes through the motor chamber and out an exhaust vent.

### It's easy to solve your dust problem with Torit Dust Collectors

Torit Dust Collectors are easy to install. They are compact and self-contained. They can be moved as required to fit all production layouts. Usually only a few feet of piping are necessary.

Torit Dust Collectors are easy on operating costs. They run only when the machine is operating. Keeping them in a clean, efficient condition is a simple matter. The filtered air is returned to the room to keep down heat losses.

Torit Dust Collectors are easily obtainable. Types for most standard dust operations are kept in stock, and special setups are quickly fabricated in our complete plant. For details and the latest Torit Catalog write:

**TORIT**

**Manufacturing Co.**  
303 Walnut St., St. Paul 2, Minn.



# New, Unique Simplicity!...

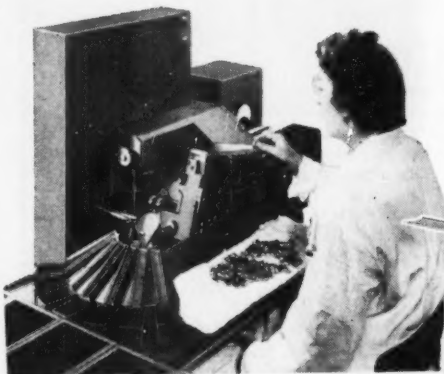
*in custom-engineered*

**ELECTRONIC**

**INSPECTING**

**AND SORTING**

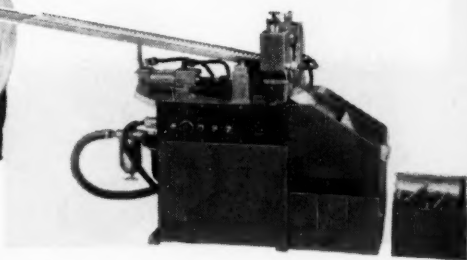
**EQUIPMENT**



▲ This single-motor, compact machine automatically gages and sorts anti-friction bearing rolls. It rejects rolls above or below mfg. tolerance and separates accepted rolls into 5 sized categories, in increments of .00002".

Through basic engineering developments, Brown & Sharpe is able to custom-build uniquely simple inspecting and sorting machines for precision parts. Machines of this description made by Brown & Sharpe have the advantages of simpler, sturdier construction; more stable adjustments; and easier manipulation of sensitivity.

Why not turn over your problem of getting machines like these to Brown & Sharpe? Learn what Brown & Sharpe can offer in custom-built inspecting and sorting machines, from manual loading and disposal to fully automatic. Send requirements outline to Brown & Sharpe Mfg. Co., Providence 1, R. I., U. S. A.



▲ This machine gages and sorts straight sleeves into four categories — measuring for length as well as diameter at both ends. Its production rate is approximately 3000 per hour.

## BROWN & SHARPE



# Let **MEAD'S** **STEEL-FINGERED GIANTS**

**DO THAT JOB**

*Faster, Better, Cheaper*

## Use **MEAD AIR POWER**

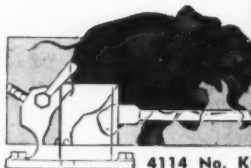
Get faster, more economical production set-ups—investigate the entire "family" of Mead Air-Operated devices. Do you want to move things—lift them, slide them, tilt them—or hold them firmly? Mead Air Power will do it. Do you need a delicate flexible touch—or tremendous power? Mead Air Power has both.

Besides the standard, ready-made fixtures for the application of Air Power (such as the Air Press, Air Vise, Air Chuck, Air Clamp) Mead offers a wide selection of air cylinders which can be used in special jigs and fixtures. Illustrations show four types of double-acting cylinders which can be furnished in five different bores with optional lengths of stroke.



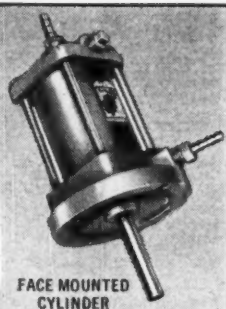
### **CATALOG READY**

Send for copy of our new Air Power Catalog illustrating, describing many new man-and-money-saving devices.

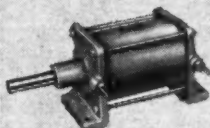


**MEAD**  
SPECIALTIES COMPANY

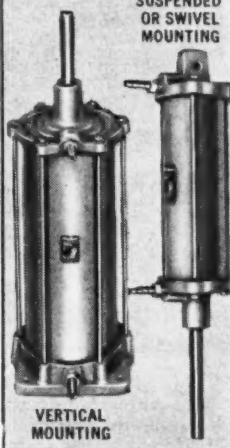
4114 No. Knox Avenue, Dept. YA-129, Chicago 41, Ill.



FACE MOUNTED  
CYLINDER



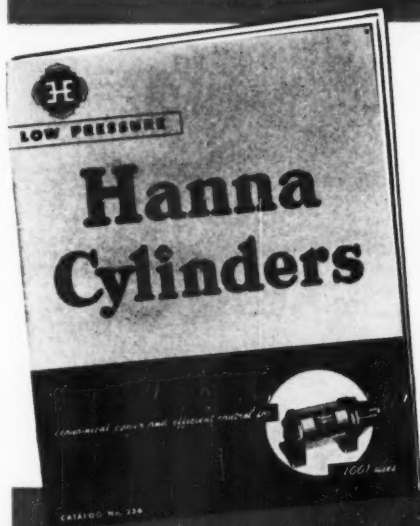
HORIZONTAL  
MOUNTING



SUSPENDED  
OR SWIVEL  
MOUNTING

VERTICAL  
MOUNTING

# New Hanna *Low Pressure Cylinder* Catalog!



New Hanna Catalog 236 gives you the complete story on Hanna Low Pressure Cylinders . . . includes dimension drawings, construction features and capacities of all standard-sized cylinders . . . gives information on mounting brackets, cylinder cushions and accessories . . . 20 pages of cylinder facts . . . a copy is yours for the asking!



*Send for Your  
Copy Today*



**Hanna Engineering Works**

HYDRAULIC AND PNEUMATIC EQUIPMENT . . . CYLINDERS . . . VALVES . . . RIVETERS

1745 Union Avenue, Chicago 22, Illinois

# L-W

## SWIVEL BASE MILLING MACHINE VISES

**MASTER \$46.95**

Jaws:  $6\frac{1}{2}$ " wide, 2" deep.  
Opens 4" with jaws,  $5\frac{1}{4}$ " without.  
Wt. complete with crank, boxed, 85 lb.

★  
**JUNIOR \$31.45**

Jaws:  $4\frac{1}{2}$ " wide,  $1\frac{3}{4}$ " deep.  
Opens 3" with jaws,  $3\frac{1}{2}$ " without.  
Wt. complete with crank, boxed, 35 lb.

★  
**HUSKY 3" \$18.80**

Jaws: 3" wide, 1" deep.  
Opens 2" with jaws.  
Wt. complete with crank, 16 lb.

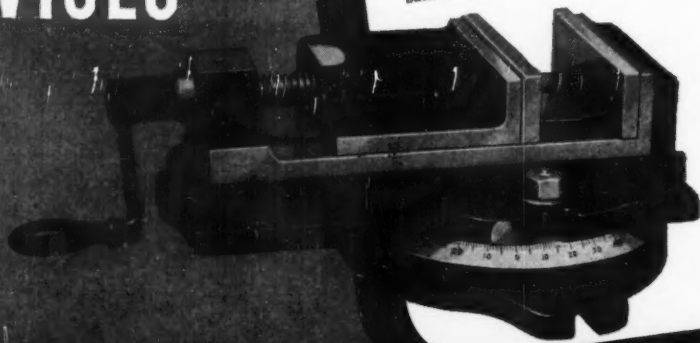
★  
**STEEL JAWS**  
Suited to drill press and shaper work.

**GRADUATED BASE**  
Can be used plain or swivel.

**LARGE ACME STEEL SCREW**  
Contributes sturdiness and durability.

**FOUR BOLT AND KEY SLOTS**  
are provided for rigidly attaching to machine  
table so that work holding surfaces are at true  
right angles or parallel to table.

★  
So sure are we that you'll be more than happy  
with the way any L-W product does a good  
job for you, we offer an unconditional money-  
back guarantee of satisfaction.



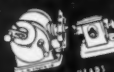
Send for complete catalog giving prices and specifications on these quality, low-cost L-W Products



DEMAGNETIZER



MAGNETIC CHUCK



DIVIDING HEAD



RECTIFIER



DEMAGNETIZING SWITCH



LATHE CHUCK



UNIVERSAL CHUCK



POWER HACK SAW



MILLING MACHINE VISE

# L-W CHUCK COMPANY

23 SO. ST. CLAIR ST.  
TOLEDO 4, OHIO

*Hy-Draulic*

Rockford Hy-Draulic  
Duplicator set-ups

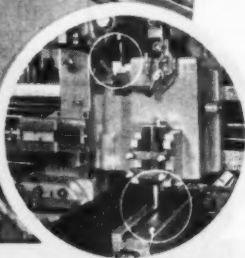
## Here's how you can do it

When parts have shapes that standard machines can't produce economically . . . a Rockford Hy-Draulic Duplicator is often the answer. When you equip a Rockford Hy-Draulic 36" Openside Shaper, Planer or Shaper-Planer with a Rockford Hy-Draulic Duplicator such work as machine die or mold contours or producing parts with accuracy and considerably lower cost.

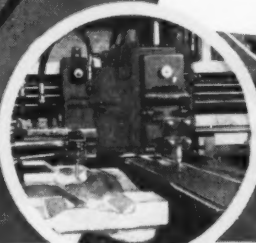
If you now have work that costs too much to produce, investigate the Rockford Hy-Draulic Duplicator. Your inquiry is invited.

**ROCKFORD MACHINE TOOL CO., Rockford, Illinois**  
ROCKFORD Hy-Draulic SHAPERS • PLANERS  
SLOTTERS • SHAPER-PLANERS

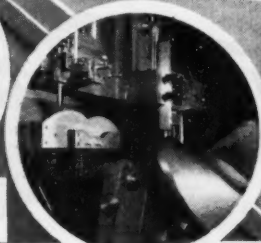
4903-A



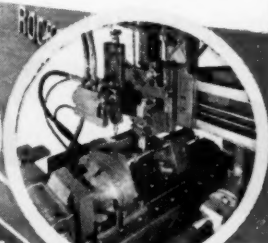
1. with stationary template  
mounted on the rail



2. with traveling template  
mounted on planer table or  
shaper ram



3. with stationary template and  
generating table fixture

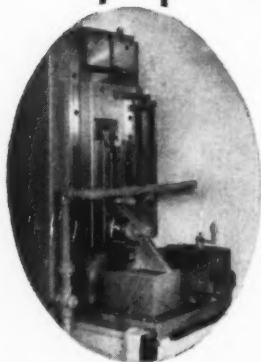


4. with traveling template and  
generating fixture

**CONTOUR WORK MACHINED WITH EASE • ACCURACY • SPEED**

# Now— A BROACHING MACHINE THAT WILL DO ALL 4

1. Internal Push Broaching
2. Surface Broaching
3. Slotting
4. Press Work



at a  
price far below  
single-purpose  
ram type  
broaching  
machines



Available in 4, 6, and 10 ton capacities  
and in 24 and 36 inch strokes

## The New "Ram-Press"

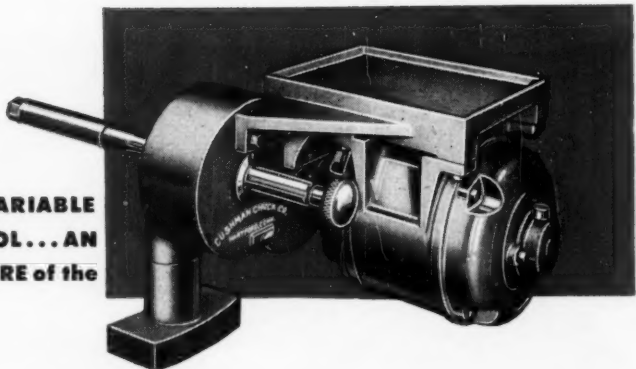


For complete information on this revolutionary machine—designed to bring the cost of broaching equipment within the reach of practically any plant—no matter how small—

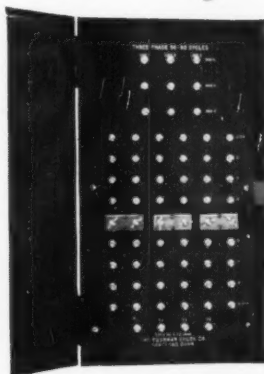
Ask for Bulletin #RP-49



**"Cushmatic" VARIABLE  
TORQUE CONTROL...AN  
EXCLUSIVE FEATURE of the**



# CUSHMAN *Power* WRENCH



"Cushmatic" torque control box, connected to power line thru lever drum switch (or push button and line starter). Torque and inertia easily adjustable... 9 stages down to 25% of maximum... 220, 440, 550 V.  
SEND FOR BULLETIN NO. 211D

The Cushman Power Wrench with its "Cushmatic" variable torque control box gives the operator a simple and highly accurate method for setting and maintaining a predetermined torque value in 9 stages from 150 to 600 ft. lbs.

Thus the wrench action is positive, safe and fast... opening and closing jaws automatically... reducing employee fatigue, speeding repetitive production with heavy chucks.

We offer as optional equipment control by means of drum switch or a heavy duty push button and reversing line starter. The machinist will need but little instruction to become thoroughly efficient in the automatically safeguarded operation of the Cushman Power Wrench.

THE CUSHMAN CHUCK COMPANY  
Hartford 2, Connecticut

Consult  
**CUSHMAN**

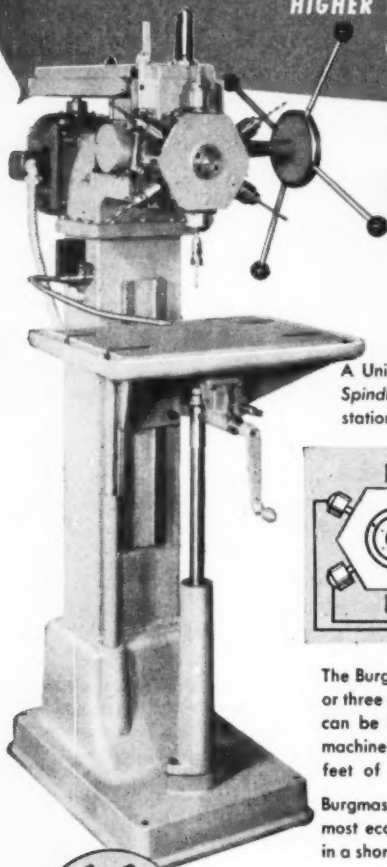
*Chucking Engineers Since 1892*

11-6268

HERE'S **6** MACHINES IN ONE!

GIVING YOU

HIGHER PRODUCTION with GREATER SPEED  
and ACCURACY at LOWER COSTS



THE NEW

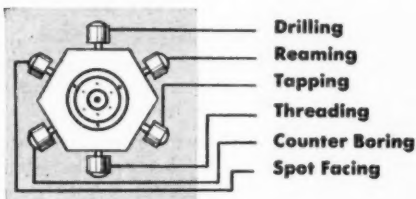
**Burgmaster**

SIX SPINDLE

TURRET TYPE AUTOMATIC INDEXING

DRILLING and TAPPING MACHINE

A Universal Type Production Machine with Pre-selective Spindle Speeds that changes quickly through individual stations for...



The Burgmaster enables one operator to do the work of two or three and get the job done faster, better. A variety of jobs can be handled without moving the work piece from the machine table. It is simple to set up, requires but 6 square feet of floor space and is powered by a single motor.

Burgmaster users will tell you that their Burgmaster is the most economical machine in their shop, and pays for itself in a short period.

Write today for detailed information.



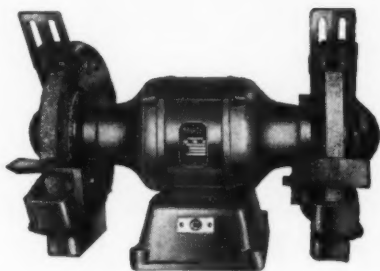
**BURG TOOL MANUFACTURING CO.**

3743 DURANGO AVE., DEPT. BB, LOS ANGELES 34, CALIFORNIA

# Baldor

**Balanced  
2 WAYS  
for  
SMOOTH,  
PRECISION  
GRINDING**

**ball-bearing GRINDERS**



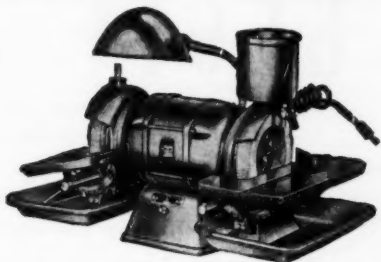
### **Special Carbide Tool Grinder**

AT RIGHT: Baldor No. 500; sturdy  $\frac{1}{2}$  hp., REVERSIBLE, ball-bearing motor; balanced rotor and wheels; 6" Silicon Carbide wheels; Adjustable tool rests and completely equipped as shown.

**\$131.40**

BALDOR heavy-duty GRINDERS are balanced 2 ways: each rotor is dynamically balanced; each wheel is balanced with Baldor's patented flanges. Fully guaranteed.

AT LEFT: No. 1010; 1 hp, ballbearing motor; 10" wheels. **\$110.00**



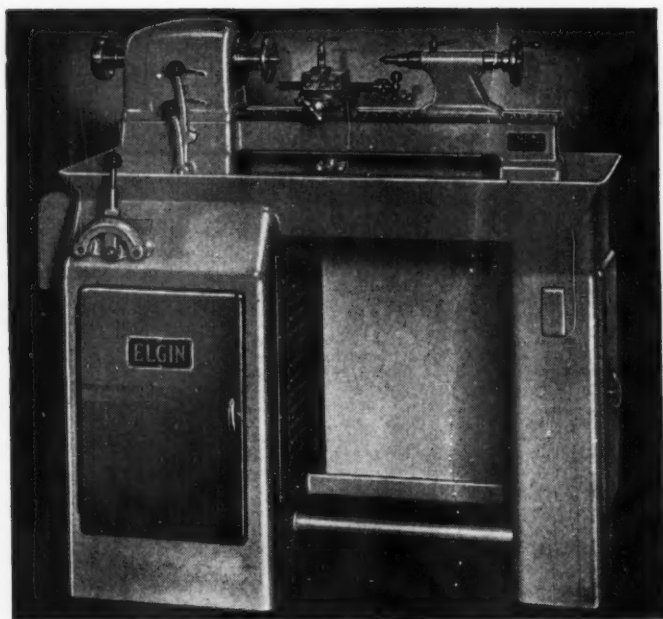
**get  
complete  
info . . .**

Simply attach memo  
to letterhead, sign  
and mail.

**MEMO** to Baldor Electric Company  
4368 Duncan Ave., ST. LOUIS 10, MO.

SEND LATEST BULLETINS on grinders, mark for attention of:

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## ELGIN Now Provides Operator Comfort

- The "Elgin Line" now is furnished with knee-hole bases with foot rests, permitting operator to sit comfortably, close-up and directly in front of work.
- Motor is mounted in base with direct cross ventilation.
- Three shelves are provided on right hand side.
- Collet board is on left hand door, below the convenient centralized controls.
- Variable speed drive provides stepless spindle speeds from 40 to 4000 rpm.

*Write for full details.*

# ELGIN TOOL WORKS

1772 BERTEAU AT RAVENSWOOD AVE. — CHICAGO, 13 ILL.

for WRENCHES . . .

# BETTER BUY BILLINGS

# BECAUSE



COMBINATION Box and Open Head combines the best features of the Engineers' and the 15° Box wrenches in one wrench. Both ends have the same size opening.

45° ANGLE BOX in both the long and short pattern, with thin sidewalls, openings chamfered for quick location over bolts and correctly proportioned handles in all sizes.

15° and 75° ANGLE ELECTRICAL thin and slender yet with ample strength for carburetor, magneto, generator, radio and electrical work. Each end has practical angle for getting into close corners.

\* Special analysis alloy steel produced to rigid Billings specifications.

Billings Vitalloy® Forged Wrenches are the aristocrats of the wrench industry! They climax nearly a century of wrench making. Every part of a Billings wrench is designed and produced to accomplish a purpose — accurately shaped openings, tapered jaws, thinner and highly polished heads, smooth rounded handles, sizes of openings clearly stamped, heavy chrome plate over copper and nickel finish — and they accomplish the purpose for which they are intended in the most efficient manner. Billings Vitalloy® Forged Wrenches are lighter, stronger and last longer. Is it any wonder experienced mechanics always reach for a "Billings"?

BETTER BUY  
**BILLINGS®**



**WRENCHES & SHOP TOOLS**

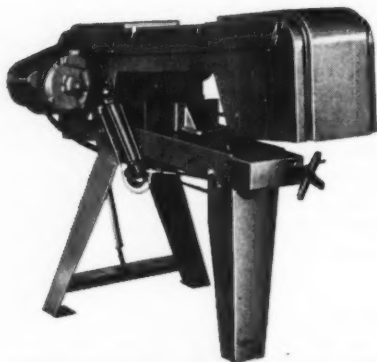
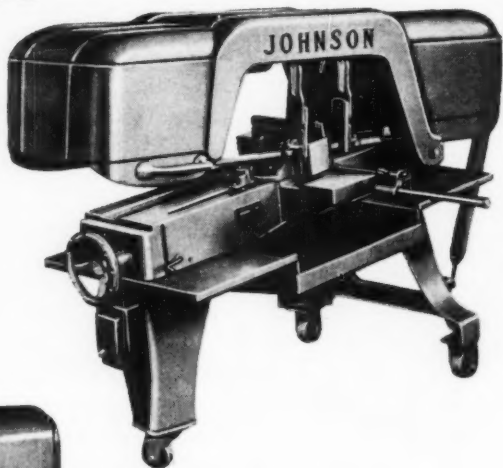
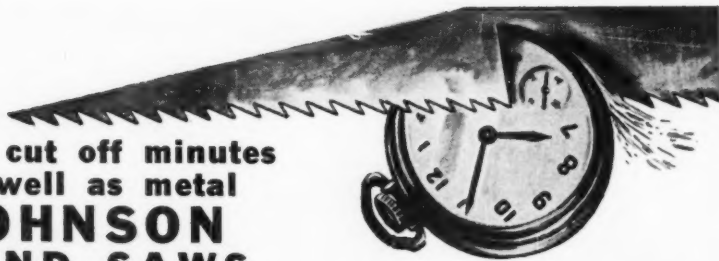
FROM BILLINGS INDUSTRIAL SUPPLY DISTRIBUTORS

THE BILLINGS & SPENCER COMPANY, HARTFORD, CONNECTICUT, U. S. A.

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They cut off minutes  
as well as metal  
**JOHNSON  
BAND SAWS**

Lock your stock in the vise, drop the saw to the work, throw the switch . . . and watch the non-stop endless blade of the JOHNSON shear down through metal for a clean, fast, accurate cut-off job . . . All controls at operator's finger-tips. Overall rigidity and extra-generous guide rolls help blades live long. Three-point suspension equalizes any floor.



**TWO TYPES**—Model J, (above) a heavy sturdy tool cuts 10" rounds, 18" flats. Model B, (at left) lighter, portable, of rigid twistproof construction, cuts 5" rounds, 10" flats.

**Send for the descriptive bulletin today.**

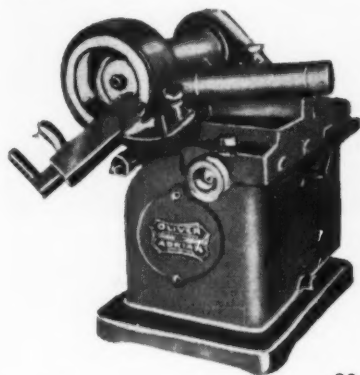
**JOHNSON** MANUFACTURING CORP.  
ALBION, MICH.



OLIVER OF ADRIAN

# Sweeping Preference for OLIVER DRILLPOINTERS

• Confirmation of industry's approval of Oliver Drillpointers is reflected in the number of Oliver machines in America's largest plants.



**510 OLIVER  
DRILL POINTER**

A completely automatic machine that grinds a scientifically correct and theoretically perfect drill point on drills  $\frac{1}{4}$ " to 3" in diameters. (Equally accurate on 2, 3 or 4 flute drills.) No. 510 provides variable point angles and clearances.

## **21 DRILL POINTER**

The Oliver No. 21 Drillpointer is easy to set, easy to operate, and produces an accurate point on drills from No. 57 to  $\frac{1}{2}$ ".

Features diamond dresser, vee belt drive, hand operated, bench type, ball bearing wheel spindle. The No. 21 will grind many types of standard or special drill points.

### **MAKE US PROVE IT!**

Send us a few of your drills. We will grind them free of cost and prove to you the efficiency of Oliver Drillpointers.

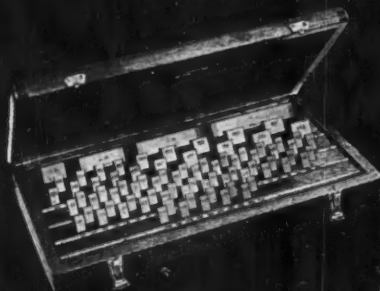
Write for Literature.  
(No Obligation.)

# OLIVER INSTRUMENT CO.

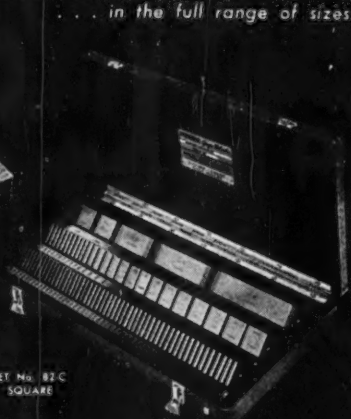
1408 E. MAUMEE • ADRIAN, MICHIGAN

AUTOMATIC DRILL GRINDERS  
TOOL & CUTTER GRINDERS—DRILL  
POINT THINNERS—TEMPLATE  
POOL GRINDERS—FACE MILL  
GRINDERS—DIAMAKING MACHINES

# ONLY FONDA MAKES COMPLETE SETS OF Lifetime-Carbide GAGE BLOCKS



SET No. 82-C  
RECTANGULAR



SET No. 82-C  
SQUARE

## OUTLASTS ORDINARY STEEL GAGE BLOCKS

*by 139 to 1*

- ◆ Surface finish 0.15 to 0.3 micro inch rms. Almost absolute perfection.
- ◆ Superior wringing qualities — wring best when dry and clean, assuring greatest accuracy.
- ◆ Retains original accuracy and Surface Finish.
- ◆ Will not rust or corrode.
- ◆ Guaranteed against breakage.

Write for  
REPLACEMENT PLAN  
AND FREE CATALOG  
48-1



**FONDA**

**GAGE COMPANY**  
STAMFORD • CONNECTICUT

A recent analysis, made by one of the largest manufacturers of Office Machine Equipment, using a total of 260 sets of steel gage blocks, indicated that the cost of their gage blocks including a rigid inspection and replacement program amounted to \$466,000 during a ten year period.

Replacement of these steel blocks with Fonda Lifetime Carbide will result in a saving of \$538,000 over a period of only twenty years.

Our representative would be pleased to assist you in analyzing your steel gage block cost and point out the savings made possible by replacing steel with Fonda Lifetime Carbide Gage Blocks.

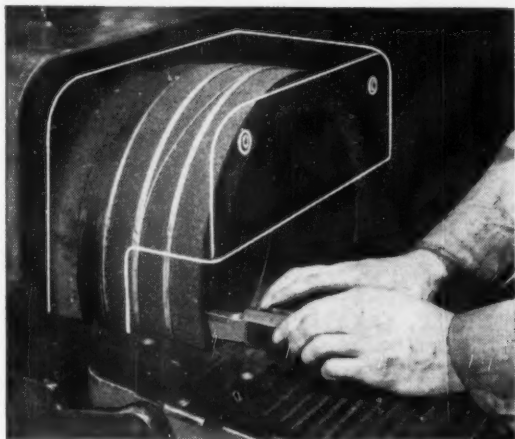
## also... FONDA "ultra-finish" STEEL GAGE BLOCKS

... complete sets and individual sizes ... standard  
inch and metric measurements ... standard  
finger wear, finer finish and superior wringing quali-  
ties make FONDA Steel Gage Blocks superior to all  
others.

# BUXITE

GRINDING WHEELS FOR CARBIDE TOOLS

## LIGHTER FEED... COOLER CUTTING



### THE BUXITE PROCESS

(Formerly Controlled by The Bridgeport Safety Emery Wheel Co., Inc.)

The Buxite Process is a revolutionary method of coating each individual grain of Buxite wheels with a microscopically thin shell of carbon in an isotropic vitrescent form. Each shell permits its grain of abrasive to turn, exposing every cutting surface before it is worn away. Each succeeding layer of grains are contained in their individual carbon shells, assuring constant grinding action during the life of the wheel.

**REPRESENTATIVES NOTE:** There are a few desirable territories available to well qualified representatives. If you are interested, write us, giving full particulars of your operation and qualifications.

Buxite grinding wheels perform better and actually cut faster with light pressure. This means that carbides and other superhard steels can be ground with less heat being generated... which prevents checking and cracking, lengthening the life of the tools.

### GRIND CARBIDE TOOLS AT 75% TO 85% LESS COST

Not only do Buxite wheels increase carbide tool life, but they give a cleaner grind and better finish. Buxite wheels do not "load" when grinding sintered tools, eliminating frequent stops for dressing, and the hard-shelled grains makes the life of each Buxite wheel 4 to 6 times that of ordinary wheels.

### REDUCE DIAMOND WHEEL CONSUMPTION

The lighter cuts and cooler grinding action of Buxite grinding wheels results in excellent finish on Tungsten Carbide and other types of superhard alloys. Buxite wheels always reduce and frequently eliminate the need for diamond wheel grinding on this type of tool. This saving in diamond wheel consumption and costs is an important reason so many manufacturers and metal working shops have standardized on Buxite wheels for their tough grinding operations.

### ADDITIONAL ADVANTAGES OF BUXITE WHEELS

Every feature of Buxite wheels contributes to faster production and lower piece cost on grinding operations involving super-hard tool steels. Faster, cooler cutting action, longer tool life, longer wheel life and reduction or elimination of diamond wheel consumption result in greatly lowered costs. If our representative has not called recently, write direct to us for additional information and money-saving facts.

**MANSO GRINDING WHEEL CO.**

1401 EAST 36TH STREET

CLEVELAND 15, OHIO

Exclusive Suppliers of BUXITE Grinding Wheels

**HERE'S  
A LESSON  
IN VALUES**



these valves pay their way every day and require no maintenance after installation.

**FULFLO**

**BY-PASS  
OIL-RELIEF VALVES**

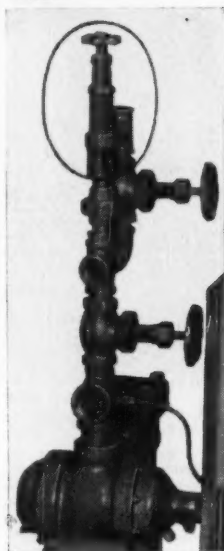
Functional operation is at its peak . . . convenience and efficiency in maintaining constant pressure are evident in the trouble-free, automatic valves as they continue on the job without interruption.

Illustration shows Fulflo relief valves built in oil spray systems by The Brown-Fayno Co., Johnstown, Pa.

**FULFLO  
COOLANT  
PUMPS**

to keep tools, machines and work cool . . . to cut down wear and tear by friction due to abrasives or cutting. All types for all purposes.

Write on your letterhead for  
**FULFLO MECHANICAL DATA BOOK**



**THE**



**Specialties Co., Inc.**  
**BLANCHESTER, OHIO**

# Cut Production Costs on small Precision Parts with Atlas 10" Lathes

Handle the work  
big lathes can't  
do economically



The low-priced Atlas "Quick-Change" 10" Lathe is tops in the shop—for precision work and economy. With 10" swing ( $6\frac{3}{8}$ " over carriage), 24" and 36" between centers, and 16 spindle speeds from 28 to 2072 RPM, it has the capacity for most small parts operations—and it's much cheaper to run than bigger lathes.

Instant selection of 54 threads and feeds saves set-up time, speeds production. And with its heavy, massive construction, precision-ground ways, and Timken Tapered Roller Bearings, the Atlas is an accurate, smooth-operating

lathe that is ideal for both 'round-the-clock production and tool room use.

Atlas standard 10" lathes start at \$212.00 F.O.B., Kalamazoo—"Quick-Change" at \$272.00. Send for latest catalog with complete facts.

**ATLAS PRESS CO.**

1250 N. Pitcher St., Kalamazoo, Mich.



**MATCHED PRECISION TOOLS FOR  
WOODWORKING AND METALWORKING**

**EASIER...  
FASTER...  
MORE...  
WHEEL DRESSINGS**

*at lower cost!*

**A FEATURE  
OF THE**

## **HANSON-WHITNEY THREAD GRINDER**

This page has been arranged for but one purpose . . . to induce you to see the new Hanson-Whitney semi-automatic Thread Grinder at work. It is impossible, in restricted space, to explain the importance of this engineering achievement . . . to provide the close-up photographs that bring out the many design innovations . . . nor can we show you the accuracy, the speed, the quality of production.

But we can arrange an appointment that we believe will interest anyone who needs a better, faster, method for grinding external threads from the solid on a production basis.

You will see a Master Roll (A) that re-trues the Grinding Wheel for regrinding the Crusher Roll (B) in position, whenever its pattern has been worn by repeated crushing of the wheel.

This means uninterrupted production for a long time . . . until the original Master Roll thread pattern itself becomes worn.

This is but one valuable feature of this machine. If the 2" (long) threading capacity . . . produced in 1-1/6 revolutions of the work . . . meets your needs, we ask you to write us.

**HANSON-WHITNEY MACHINE CO., HARTFORD 2, CONN.**  
Division of Whitney-Hanson Industries, Inc.

CATALOG  
AND PRICES ON  
REQUEST.



THW48



# ONE MULT-AU-MATIC

## REPLACES **THREE MACHINES**

One Type "D" - 8 station Multi-Au-Matic now produces 26 pieces per hour floor to floor.

Best previous method - 3 machines, each producing 9 pieces per hour.

**MANUFACTURING  
DATA**

PIECE NAME

### COMPANION FLANGE

#### MATERIAL...

Heat treated steel. Brinell Hardness 269 - 229. (370. 400mm impression diameter with 3000 kg load, 10mm ball)

#### REQUIRED TOLERANCES...

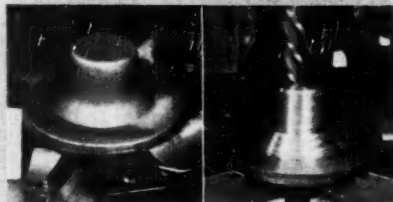
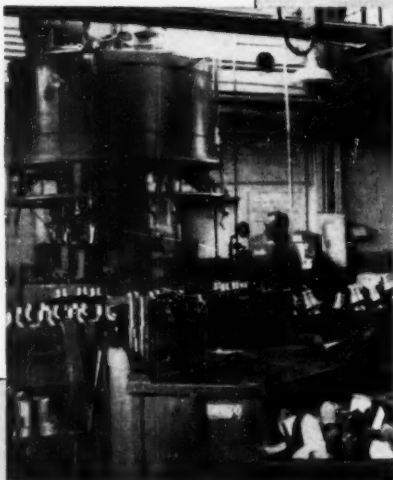
Diameters held within .005"  
Flange to face and top of hub .0015"

#### OPERATIONS...

Load  
Drill  
Turn hub  
Semi-finish - turn hub  
Ream, Chamfer hub  
Rough face top and finish flange  
Finish hub to length  
Finish taper ream  
Finish turn hub

The customer expresses satisfaction with dependable performance and comments on the economies possible with Multi-Au-Matics.

You too may benefit by investigating Multi-Au-Matics for your shop.



THE  
**BULLARD**  
COMPANY

BRIDGEPORT 2, CONNECTICUT

*Write for estimates on your work or call for a Bullard engineer.*

## YOUR FIRST and WISEST CHOICE

Eliminate fumbling and guessing  
when gaging Holes, Slots, Finding  
Centers, Locations, Etc.

Horberg Drill Size Pin Gages are  
accurate to  $\pm .0001$ — $.0000$ .



FOR



DEPENDABLE GAGING

$1\frac{1}{2}$ " long. For easy insertion, precision  
alignment, lower half is concentric tapered  
to fit holes  $0.0012$  smaller than gage size.  
Oil hardened tool steel. No other pin gage  
has such accuracy at so low a cost.

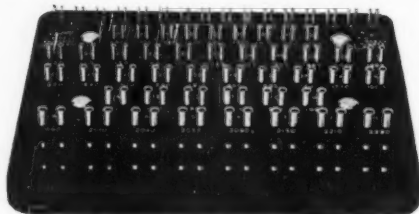
INDIVIDUAL STOCK SIZES \$1.00 each

**LETTER SETS:** 52 gages  
from A to Z—\$45

**FRACTION SETS:** 60  
gages  $\frac{3}{64}$ " to  $\frac{1}{2}$ " in steps of  
 $\frac{1}{64}$ " — \$50.

**NUMBER SETS:** 120  
gages 1 to 60 — \$90

**STAND ALONE** — \$10



Sets come in pairs for gaging any number of similar holes. All sets  
include stands of 3 plates and cover, so that gages stand upright. Drill  
size is plainly stamped in front of each hole, together with decimal  
equivalent to the ten-thousandth of an inch.

**Prices F.O.B. Bridgeport, Conn. Immediate Delivery.**

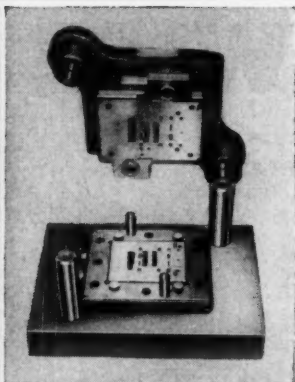
THE *Horberg* GAGE COMPANY

19 STAPLES STREET, BRIDGEPORT 1 CONN.

# PRODUCTO

## DIE SETS

HELP *Monroe* TO  
add ACCURACY  
subtract REJECTS  
divide TOLERANCES  
multiply PRODUCTION



New streamlined Monroe Calculating Machine No. CAA and (left) actual size numeral key stem.



Call "Producto" in classified telephone directory in major stamping centers. Fast service thru 26 Producto representatives.

When you have a very fussy part to produce . . . such as this numeral key stem for the Monroe Calculating Machine . . . the Die Set must be of the highest quality.

The job calls for a six station progressive piercing, shaving and blanking die, with the majority of tolerances held to  $\pm .001$ . Normally produced on an automatic press at the rate of 150 to 175 parts per minute . . . as high as 70,000 parts per grind . . . an excellent performance considering the shaving operation involved. Material is .050 half hard CRS.

With precise alignment of guide pins and bushings, and closely held parallelism of punch and die holder, extreme accuracy can be maintained. Producto Die Sets have these qualities. *Make sure* with Producto . . . for fewer rejects, longer die life, greater accuracy.

## THE PRODUCTO MACHINE COMPANY

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# **STUART'S WISE ECONOMY PLAN**

## **A SCIENTIFIC COST REDUCING PROGRAM**

**good cutting  
fluids properly  
applied**



Write, wire or phone for details.

**D.A.**  
EST. 1865

**Stuart Oil**

**co.**  
LIMITED

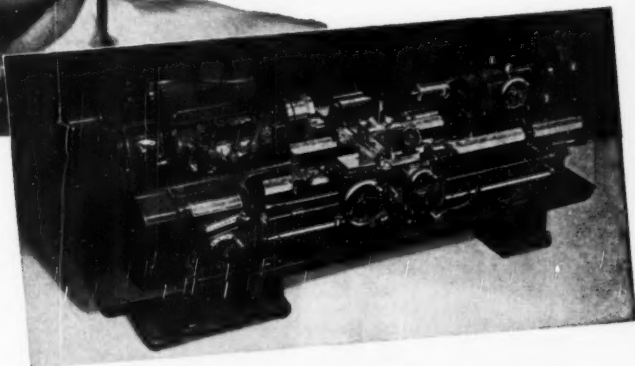
2749 S. Troy St., Chicago 23, Ill.

# AXELSON FIRST CHOICE



MASTER MACHINISTS AGREE...there is no finer engine lathe than an AXELSON. Designed by men who are themselves master tool makers, AXELSON lathes embody the features that contribute to faster production, more accurate work, easier and safer operation, and maximum versatility.

## MASTERPIECE OF PERFECTION



**THE "FEEL" OF PERFECTION...**is immediately apparent the first time a machinist puts the tool to the work in an AXELSON lathe. Velvet-smooth control action...more positive flow of power at the cutting tool without vibration or chatter.

**PRACTICAL VERSATILITY...**permits a wide variety of operations with all types of tools, on any kind of stock...two-speed tailstock...wide range of feeds and speeds instantly available.

**THE TOOL CARRIES THROUGH...**with precision accuracy from the beginning to the end of each cut. Massive construction throughout to maintain absolute alignment...perfectly mated bearing surfaces on slides and ways.

**BUILT-IN SAFETY...**protects operator from injuries, tools from breakage, and work from reject bin. All controls within easy sight and reach of operator.



# AXELSON *Lathes*

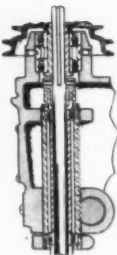
DEPENDABLE FOR A THIRD OF A CENTURY

AXELSON Manufacturing Co., Los Angeles 11 • New York 7 • St. Louis 16

Authorized Distributors In All Principal Industrial Sections

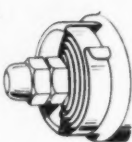
#### FOUR PRECISION BALL BEARINGS

Two on spindle, two on drive sleeve. Pre-lubricated and sealed precision type, no oiling required.



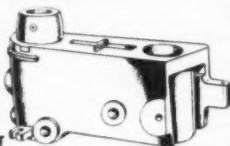
#### ADJUSTABLE QUILL RETURN SPRING

Retracts quill instantly upon release of feed lever. Tension of spring adjustable.



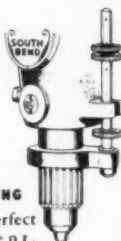
#### ONE-PIECE HEAD CASTING

Insures perfect alignment. Double-plug binder locks the head to column. Column bearing is NOT split.



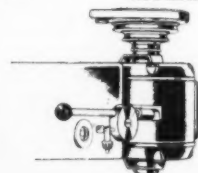
#### DEPTH GAUGE

Controls feed depth, length of return stroke, or locks spindle in any position. 16th graduations.



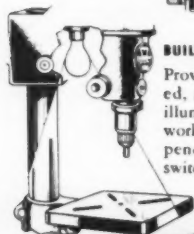
#### BELT TENSION RELEASE

Flip of lever removes tension from belt for easy speed changes. Proper belt tension maintained.



#### BUILT-IN LIGHT

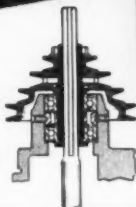
Provides shielded, shadowless illumination on work area. Independent on-off switch is built-in.



**NEW!**  
SOUTH BEND  
14" Drill Press

#### FREE-FLOATING SPINDLE

Design prevents misalignment, side thrust and whip. Precision splines in spindle and sleeve.



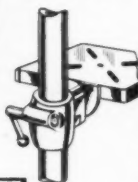
#### QUILL BEARING ADJUSTMENT

Shoe-type take-up provides feather-touch tension and secure locking. Quill bearing is NOT split.



#### TABLE LOCK

Double-plug binder securely locks table to column. Eliminates misalignment. Column bearing is NOT split.



#### CAPACITIES — SPECIFICATIONS

##### CAPACITY

Maximum drill size in iron or steel— $1\frac{1}{2}$ ". Drills to center of  $14\frac{1}{8}$ " circle.

##### CHUCK

Capacity—0 to  $\frac{1}{2}$ "

##### SPINDLE

Regular drill chuck type supplied. Travel.....4"

##### CHUCK TO BASE DISTANCE

Bench Model—17" Floor Model—46 $\frac{1}{2}$ "

##### SPINDLE SPEEDS

Four—655 to 4530 r. p. m.

##### TABLE SIZE

10" x 10". Tilts to any angle.

Bench Model

**\$129<sup>30</sup>**

Floor Model

**\$144<sup>30</sup>**

Prices, f.o.b. factory, include drill chuck and 1/3 h.p., 115 or 230 v., 1 ph., 60 cycle motor and switch.



#### INTERCHANGEABLE SPINDLES

Spindles available to take No. 2 Morse taper shank tools, and for 1/2" straight shank tools, router bits, shaper cutters, etc.

## SOUTH BEND LATHE WORKS

BUILDING BETTER TOOLS SINCE 1906 • 426 E. MADISON ST., SOUTH BEND 22, IND.





Why HUNT RABBITS  
with a TANK?



on Most Jobs a KRW 100-TON PRESS WILL  
EQUAL HEAVIER, COSTLIER, EQUIPMENT

and SAVE YOU MONEY!

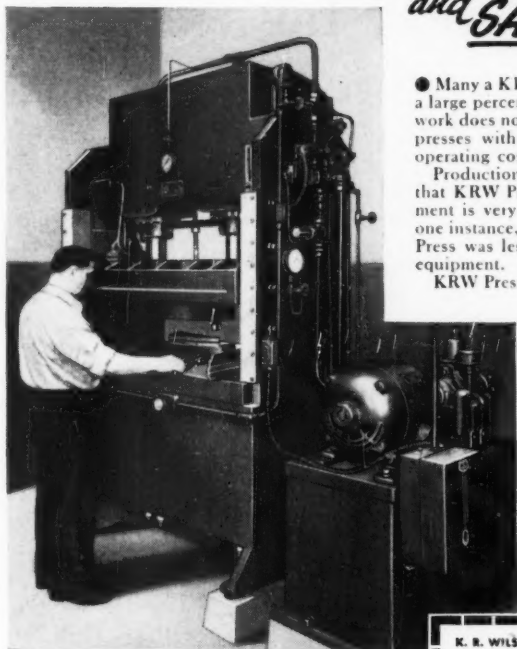


Illustration shows a KRW 100-Ton Hydraulic Press in plant of Elrae Pressed Metals, Inc., Buffalo, N. Y. When the picture was taken, bicycle parts were being formed.

● Many a KRW Press user discovered long ago that a large percentage of forming, drawing and stamping work does not require the use of large, heavy-tonnage presses with their accompanying high initial and operating cost.

Production records, in a variety of industries, show that KRW Presses greatly reduce costs. First investment is very low, operating costs are still lower. In one instance, the purchase price of a KRW Stamping Press was less than the foundation cost for heavier equipment.

KRW Presses are highly flexible... they can be built in varying bed lengths. KRW Presses are available as either Gap, Open End or Closed End Types. Tonnage pressures vary from 25 to 100 tons. Because they are hydraulically operated and not mechanically driven, they are quiet and vibrationless in operation. Platens can be stopped and reversed at any point.

Let us know your needs... we are fully equipped to engineer our equipment to handle your work. In the majority of cases, we can make delivery in a fraction of the time required for other type presses. Let us hear from you.

K. R. WILSON, 215 Main St., Buffalo 3, N. Y.

Please send me complete information on new KRW 100-ton Hydraulic Presses.

Name

Address

City and Zone  State

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**K·R·WILSON**

215 MAIN ST. · BUFFALO 3, N. Y.

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**The Flutes in a Tap  
must have  
identical shape  
and length of grind, and  
indexing must be accurate.**

*Only a Blake Flute  
Grinder assures  
you of accurate  
control of all these  
factors. Ask for  
Bulletin 649 today.*



**437 Cherry Street • West Newton 65, Mass.**

**Black Diamond Precision Drill Grinders . . . Blake Tap Chamfer Grinders . . .  
Blake Flute Grinders . . . Waltham Cutter Sharpeners . . . Waltham Thread Milling  
Machines . . . American Tool Holders . . . Surface Finish Standards**

## DANLY DIE SETS

*less  
time*

### IN THE DIE SHOP

Rebore Danly precision makes die assembly quicker and easier. possible reworking of die sets to make them square and true is eliminated. Precision leader pin and bushing fits assure accurate die closure and protect delicate die components. Danly Die Sets mean better dies in less time!

*longer  
life*

### ON THE PRODUCTION LINE

Personal grinding and lapped leader pins resist wear... accurate die relationship minimizes punch shearing and die breakage. Precision Danly Die Sets bridle die maker's precision in the press setup, die working premature die wear. Danly Die Sets mean more parts per grind!

Courtesy Quality Hardware, Chicago

Danly precision makes every Danly Die Set a reliable foundation for the finest die work. And in addition to the performance advantages they assure, Danly Die Sets are quickly available, too, from a nationwide system of completely stocked assembly branches.

Large or small, standard or special, there's a Danly Die Set to meet every tooling need. Just contact your nearest Danly branch for fastest delivery of the best in die sets.

**Danly Machine Specialties, Inc.**

2100 South 52nd Avenue, Chicago 50, Illinois.



### WRITE FOR THIS FREE BULLETIN

...and see how Danly's special die set machining service can help reduce your costs.

DANLY PRECISION DIE SETS... STANDARD AND SPECIAL

OVER 25 YEARS OF DEPENDABLE SERVICE TO THE STAMPING INDUSTRY

### WHICH DANLY BRANCH IS CLOSEST TO YOU?

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- \*Cleveland 14, 1550 East 33rd Street
- \*Dayton 2, 990 East Monument Avenue
- \*Detroit 16, 1549 Temple Avenue
- \*Grand Rapids, 113 Michigan Street
- \*Long Island City 1, 47-28 37th Street
- \*Los Angeles 54, Ducommun Metals & Supply Co., 4890 South Alameda
- \*Milwaukee 2, 111 East Wisconsin Avenue
- \*Philadelphia 44, 18 West Chelton Avenue
- \*Rochester 4, 16 Commercial Street

\*Indicates complete stock

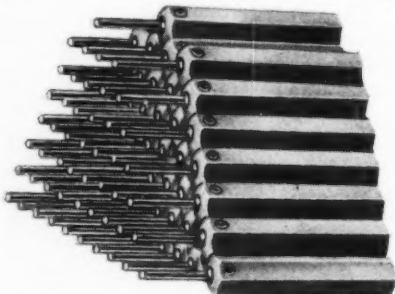
**DANLY**

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# Van Keuren

**CARBOLOY**  
Wire Type  
**PLUG GAGES**  
*are the right answer*



**1 VK CARBOLOY = 50 TOOLSTEEL GAGES**

After considerable experimentation with various wear resistant materials, we have chosen Carboloy as being the most practical, durable and economical. Carboloy does not flake or chip easily and is quite suitable for wire type plug gages as small as .020" in diameter.

Wire Type Plug Gages were originated by the Van Keuren Co. in 1925 and are now recognized as the most economical gages for measuring small holes. The original wire type plug gages were made of tool steel—High Speed steel doubled gage life. VK Chromium Plate gave 5 times the life, and VK Carboloy 50 times the life of tool steel gaging units. All of these materials are still in use and have their particular applications.

VK Carboloy gaging units are made in sizes from .020" to .500" diameter. They are made only in the wire type design because this is by far the most economical plug gage. In cases where it is desired to use VK Carboloy wire type Go units with existing No Go taper insert units, special handles can be furnished for this purpose.

Van Keuren Wire Type Plug Gages assure longer lasting precision and lower gage cost, because the entire 2" length of gage can be used. When the end of the wire becomes worn it is ground off. The wire type unit is securely held in the unit by a split bushing and a headless set screw.

VK Carboloy Wire Type Plug Gages are made to Class B accuracy, plus .00005" minus .00000" on the Go unit and plus or minus .000025" on the No Go unit. Closer or wider tolerances can be supplied if desired.

On your next order Specify VK Wire Type Plug Gages: VK Carboloy for long runs because of the enormous saving in gage cost; VK Carboloy for fussy jobs because of the infinitesimal gage wear and insurance that the parts will be within the specified limits; VK Tool Steel—High Speed Steel—Precision Chromium for less exacting jobs. You will be assured of the best in accuracy, quality and delivery.

**VK CATALOG AND HANDBOOK No. 34**



This 208 page volume represents 2 years of research sponsored by the Van Keuren Co.

It presents for the first time in history a simple and exact method of measuring screws and worms with wires.

It tells how to measure gears, splines and involute serrations. It is an accepted reference book for measuring problems and methods.

Copies free upon request.

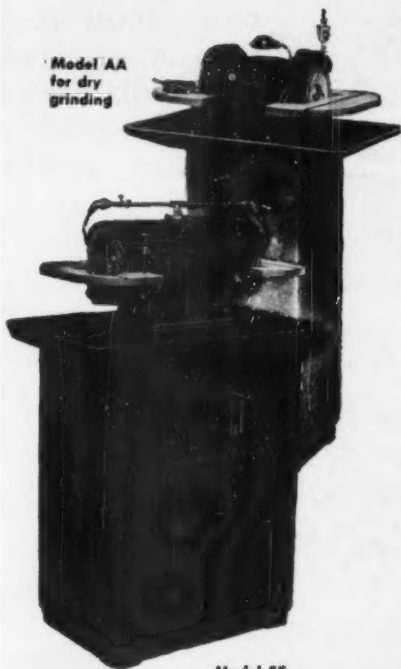
**THE Van Keuren CO., 177 Waltham Street, Watertown, Mass.**

**30th YEAR**

Light Wave Equipment • Light Wave Micrometers • Gage Blocks • Taper Insert Plug Gages • Wire Type Plug Gages • Measuring Wires • Thread Measuring Wires • Gear Measuring System • Shop Triangles • Carboloy Plug Gages • Carboloy Measuring Wires

# GRIND TOOLS TO EXACT ANGLE ..FASTER

Model AA  
for dry  
grinding



Model EE  
for grinding  
wet or dry

## PROSSER CARBIDE GRINDERS

**YOU GET** the grinding angle you want instantly with the famous indexing feature of these Prosser high-speed grinders. The quick-acting tables need never be raised or lowered—and once set, they stay put.

**ECONOMICAL**—You'll save time and you'll get more for your wheel dollar with a Prosser because wheels are easily adjusted to compensate for wear. Wheels can be used up practically 100%.

**VERSATILE**—Designed by the same Prosser engineers who introduced cemented carbide to American industry, today's Prosser Carbide Grinders are equally effective on stellite and high-speed steel.

Before you get a grinder for rough work or fine finishing, wet or dry...get the facts on the Prosser. For details on bench and floor models, on chip-breaker, drill-grinding and other attachments...write for literature.

**DEALERSHIPS AVAILABLE**

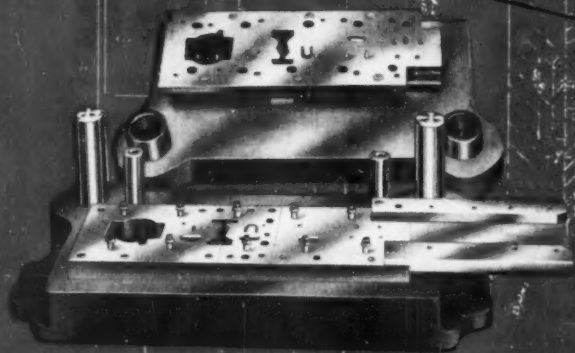
Established

**1845**

**THOMAS PROSSER & SON**

**120 Wall Street, New York 5, N.Y.**

# Stampings Cost Less with



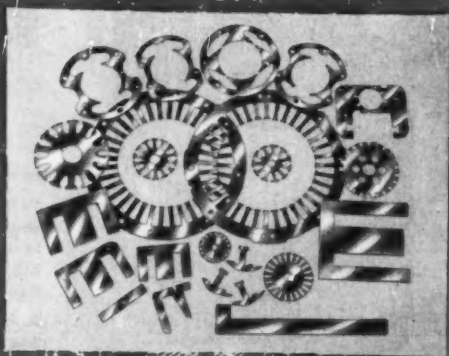
CARBIDE LAMINATION  
DIES • STAMPING •  
DIES OF ALL TYPES  
• TOS • FIXTURES •  
GAUGES • SPECIAL  
MACHINE WORK •

Typical HARIG  
Progressive Die



## HARIG PRECISION DIES

- LAST LONGER
- PRODUCE BETTER STAMPINGS
- COST LESS PER THOUSAND  
BLANKS
- THE BETTER QUALITY P-A-Y-O-F



A few types of precision blanks  
produced from HARIG Dies



# HARIG

## MANUFACTURING CORPORATION

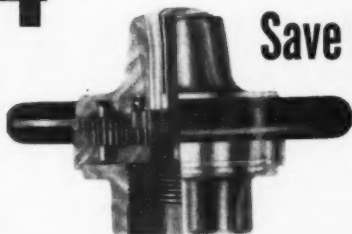
*Your Inquiries Invited*

323 NORTH ALBANY AVE. • CHICAGO 12, ILLINOIS



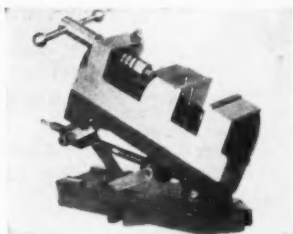
# 4 Items To Reduce Costs

## Save Operating Time



### COLLET TYPE SPEED CHUCKS

- Increase capacity up to 40% by elimination of draw table and sleeve inside.
- Eliminates use of wrenches and chuck keys as handwheel quickly opens and closes collets.
- Fits all lathes.
- Accuracy insured through precision collets in precision chucks.
- Five sizes from 1" to 3½" collet capacity.
- From \$79. to \$250.

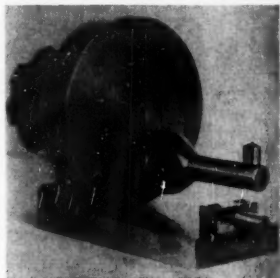


### QUICK-LOK MACHINE TOOL VISES

- Available in 14 types and sizes from 3" to 9" opening, swivel plain or angle.
- Useful as a jig.
- Semi-steel castings hardened and ground parts.
- Rough and final adjustments easily executed.
- From \$16. to \$160.

### EXPANDING MANDREL SETS

- One Expanding Mandrel takes the place of 12 or more plain arbors.
- Capacities from 3/8" to 5½" diameter.
- Length of arbors from 4½" to 18¼".
- Taper per foot from 1/2" to 1 1/8".
- 19 standard sizes.
- Sets from \$32. to \$79.
- Individual Mandrels from \$7.



### RADIUS EMERY WHEEL DRESSER

- Designed to meet the demand for an inexpensive Radii Emery Dresser for concave or convex radius dressing.
- Capacity: 2½" concave, 1¾" convex.
- Maximum wheel size 8".
- Overall dimension: 6" x 6" x 3".
- Price \$72. Available with built-in Micro-meter adjustment, \$150.

### Prompt Delivery

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# MONTGOMERY & CO., Inc.

Since 1876

55 PARK PLACE

NEW YORK 7, N. Y.

# ***NEW Kalamazoo***

## **METAL CUTTING BAND SAW**



**\$245<sup>00</sup>**

F.O.B. WITH MOTOR

KALAMAZOO NO. 610-S

★ **UNOBSTRUCTED VIEW  
OF CUTTING OPERATION**

★ **6" x 10" CAPACITY**

★ **4 CUTTING SPEEDS**

★ **½ MINUTE BLADE  
CHANGES**

★ **CONSTANT, CONTROLLED  
PRESSURE ON CUTS**

The new Kalamazoo Metal Cutting Band Saw No. 610-S is today's outstanding tool value! It combines many new exclusive features with rugged construction for exceptional sawing service.

It cuts angles, bars, tubes, pipe up to 6" x 10". Four speeds (53 to 266 FPM) provide wider choice in matching cutting speed to material.

A unique dash-pot mechanism insures constant, controlled pres-

sure from beginning to end of cuts. Blade mounts conveniently from the top—can be changed in 30 seconds. No yoke or frame hides work from view.

The 610-S has 4 legs for greater stability, weighs 198 lbs. for complete portability. Uses any standard motor (½ HP 110/60/1).

Write today for full details on this outstanding low cost saw.

**MACHINE TOOL DIV. *Kalamazoo* TANK and SILO CO.**

**1221 HARRISON STREET**



**KALAMAZOO 16, MICHIGAN**

Sixth in a series of  
Unusual Grinding  
Wheel Operations



# GRINDING WHEEL MEETS COCOA BEAN!

● The delicious chocolate flavor of Hershey's and other brands of chocolate, starts with the grinding of the dried cocoa beans. Pulverizing the bean by grinding, rather than by any other process, retains the original flavor.

Whatever *YOUR* grinding problem may be, **BAY STATE** can solve it . . . fast. Possibly the exact specifications to meet your requirements can be supplied directly from large stocks either in Westboro, branch warehouses, or from our distributors strategically located throughout the United States.

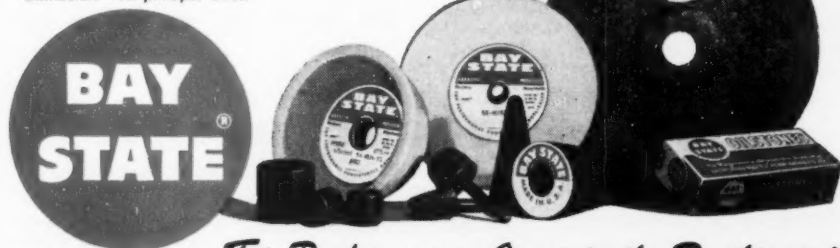
Send us your grinding problems. We can help you.



These mills, using fine, hard grinding wheels convert the dried cocoa beans into rich chocolate liquor.  
Courtesy of Hershey Chocolate Corporation

## BAY STATE ABRASIVE PRODUCTS CO. Westboro, Massachusetts, U. S. A.

Branch Offices and Warehouses —  
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*Top Performance Consistently Duplicated*

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# "Buffalo" DRILLS CAN CUT YOUR MANUFACTURING COSTS!



1. "Buffalo" No. 18 Drills in twelve styles handle high speed production up to 1" holes. Bulletin 3123-B.

2. Rigid, accurate No. 14 Sensitive drills for  $\frac{3}{8}$ " work. Bulletin 2726-D.

3. "Buffalo" No. 15 Heavy-Duty production Drill for up to  $\frac{1}{2}$ " capacity. Bulletin 3963-D.

4. No. 16 Drills are available in 8", 12" or 15" overhang. Up to  $\frac{3}{8}$ " holes. Bulletin 2730-F.

## WRITE US ABOUT YOUR DRILLING PROBLEM

- If you use the smallest commercial drills—or do 2" work in cast iron—or anything in between—"Buffalo" Drilling Machines can help you!

These sturdy, simply designed drills are available in a wide combination of models to meet your special needs. Multispindle drills allow several operations at once without timeouts for set-up changes. The famous "RPMster" permits instant speed changes at the touch of a lever. From the "Buffalo" No. 14 Drill to the big Motor Spindle Drill, there is a "Buffalo" Drill to cut time on your operation.

Free Bulletins On All  
Buffalo Drills Are Yours On Request

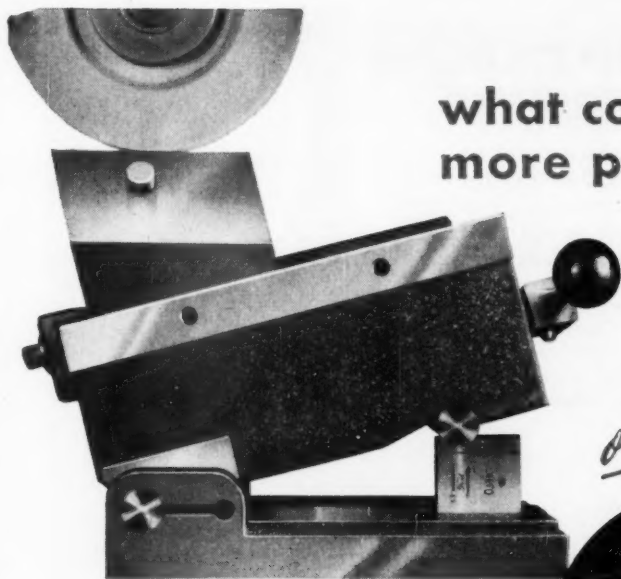
## BUFFALO FORGE COMPANY

161 Mortimer St.

Buffalo, New York  
Canadian Blower & Forge Co., Ltd., Kitchener, Ont.

- Time-savers on set-up changes—where time counts!
- Every drill designed for simple, quick operation!
- Rigid, precision construction for long, accurate service!
- A drill for every production and tool room need!
- Multispindle models for multiple operations.

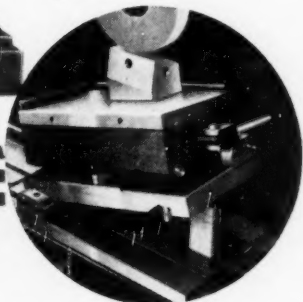
DRILLING PUNCHING CUTTING SHEARING BENDING



what could be  
more positive...

*or simpler?*

## The MAGNA-SINE for angular work



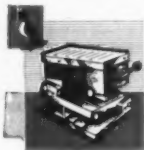
The Magna-Sine, used with standard gauge blocks, is the only positive shop method of making fast angular set-ups. Plus this angular accuracy, the work piece is held securely, without distortion, by magnetic attraction on a permanent-magnet chuck.

The Magna-Sine—except magnetic parts—is made of hardened, seasoned steel and all gauging surfaces are ground and lapped flat and square for positive accuracy from every set-up.

Set-ups are made by inserting standard

gauge blocks between the plates of the Magna-Sine. The proper blocks are indicated for all angles in the Table of Constants furnished with every unit. No dials to go out of adjustment; no scales to mis-read . . . no parts to move or go out of adjustment after the set-up is completed.

*Write for descriptive bulletin which gives full details and prices on these versatile units. Thousands are in daily use.*



OMER E.

*Robbins* COMPANY

*Manufacturers of the MAGNA-SINE and Other Precision Tools*

5722 Twelfth Street

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## GROBET CHATTERLESS COUNTERSINKS

Six staggered cutting edges give a shearing cut that eliminates all chatter. Made of high speed steel ground after hardening.

12 sizes:  $\frac{1}{4}$ ,  $\frac{3}{16}$ ,  $\frac{3}{8}$ ,  $\frac{1}{2}$ ,  $\frac{5}{8}$ ,  $\frac{3}{4}$ ,  $\frac{7}{8}$ , 1,  $1\frac{1}{4}$ ,  $1\frac{1}{2}$ ,  $1\frac{3}{4}$ , and 2 inch.

Standard 30°, 41°, 45° with center line. Also made in any other angles to order.

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SINCE 1812

SET OF ELEVEN  
COUNTERSINKS  
IN STRONG  
WOODEN CASE  
1/4" to 1 1/2"

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**SOLD THROUGH LEADING SUPPLY HOUSES.**

*Cut  
Press Time  
to 1/3*



## **LOW-COST AIR-OPERATED PRESS** *FOR Faster Production*

If you have been using up valuable man-hours with a hand-pumped press, eliminate this waste right now. Here's a speedy air-operated press that really saves production time. Actual tests show that in many instances it cuts  $\frac{2}{3}$  of the time needed for a press op-

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For further information about this or any other Dake press, mail the coupon for your free copy of the Dake press catalog.



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Memo- To Toolroom Foreman

Be sure to look into the **NEW**

# LUCIFER

Electric Heat Treating Furnace  
only \$195<sup>00</sup>\*

Full 6"x6"x12" muffle\*  
2000° F in approx. 75 minutes

Ample power - 4 K W.

Write for illustrated literature  
Gilbert S. Simonski Mfg.  
401 N. Broad St. Phila. 8 Pa.

This series furnace available  
in 9"x9"x18".

\* Also 12"x12"x24" Muffles.

All these models are floor  
models, not bench.

## Preventing END BEARING OF GEAR TEETH...

- increases their factor of safety
- reduces gear noise
- and prolongs service life

Conventional gear teeth (spur or helical) can be expected to behave as they should theoretically only on the drafting board. When they are made of steel and assembled in a power unit, it is a rare accident when bearing is uniform across the entire faces of any two mating teeth. In nearly every case bearing is concentrated at one end of the tooth or the other where it is most vulnerable to failure.

The remedy is the Elliptoid Tooth Form, engineered and produced by Red Ring engineers 12 years ago. The Elliptoid Tooth Form positively prevents end bearing as demonstrated by actual experience in hundreds of applications.

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*Send for descriptive literature.*

SPUR AND HELICAL  
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ORIGINATORS OF ROTARY SHAVING  
AND ELLIPTOID TOOTH FORM

**NATIONAL BROACH AND MACHINE CO.**

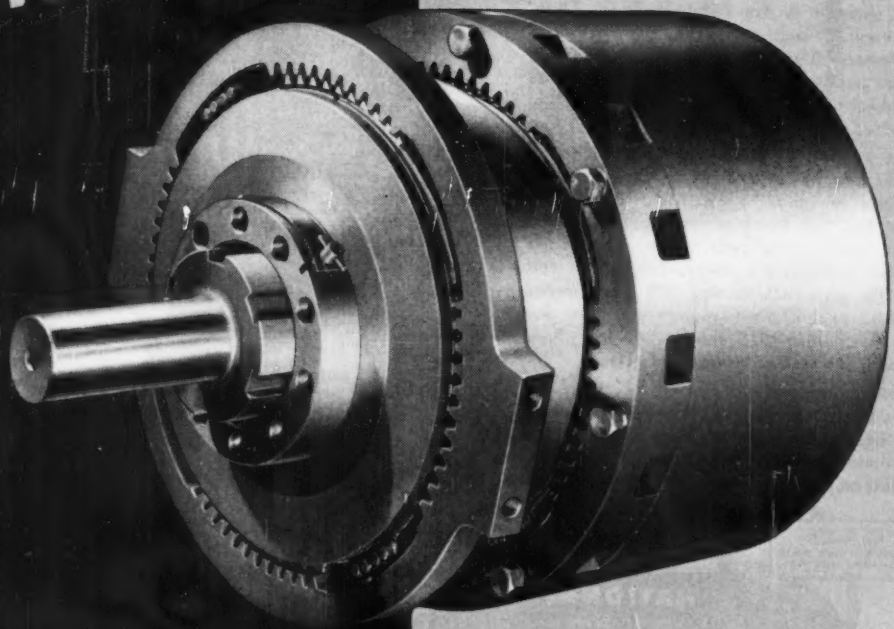
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WORLD'S LARGEST PRODUCER OF GEAR SHAVING EQUIPMENT

*Why This*

**NIAGARA**

**AIR FRICTION CLUTCH**



NIAGARA MACHINE AND TOOL WORKS, BUFFALO 11, N. Y.

# is Another Reason for satisfaction with **NIAGARA** single and double Crank Presses

● On single stroking operations where the going is tough, Niagara Air Friction Clutches have met every test of time and service.

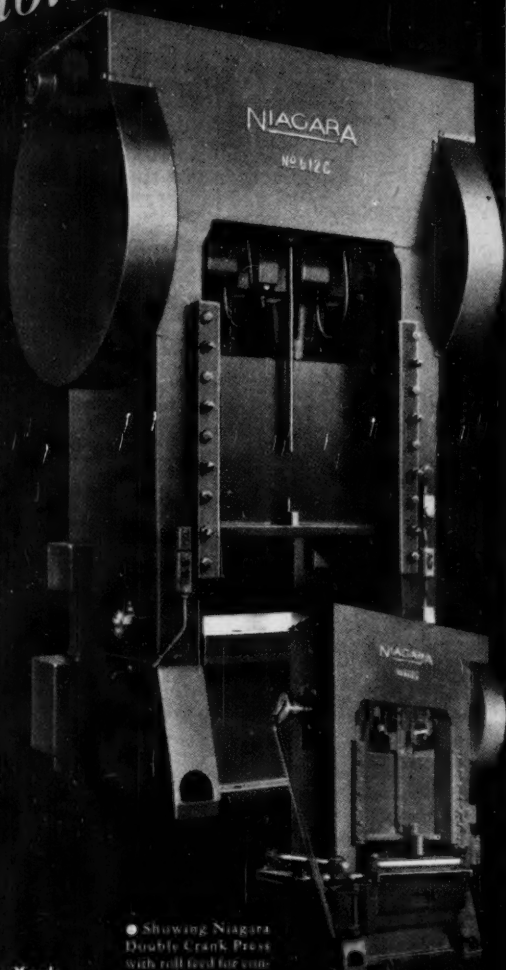
Safe, effortless push button control contributes to maximum hourly output. Controls can be arranged in various ways to suit all operating conditions. Clutch and brake action is instantaneous, smooth and quiet. There can be no overlapping of clutch and brake action. Extra locking palm buttons can be supplied for additional operators.

Pressure on all buttons not locked out of the circuit is required to release the brake and engage the clutch. Release of any one button on the down stroke disengages the clutch and applies the brake causing the press to come to an immediate stop.

Slide can be inched for adjusting dies.

Flywheel mounted on anti-friction bearings. Clutch maintenance is cut to a minimum.

Photographs at right show modern Niagara Double Crank Presses. They are available in a wide range of sizes and capacities.



● Showing Niagara Double Crank Press with roll feed for continuous operation.

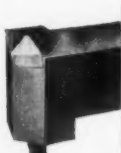
District Offices: Detroit, Cleveland, New York



Kennamatic Style RAR



Kennamatic Style TAR



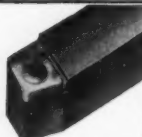
Kennamatic Style TBR



Kennamatic Style TFR



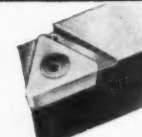
Kennamatic Style SBR



Kendex Style 11SKD



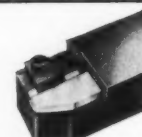
Kendex Style 3RKD



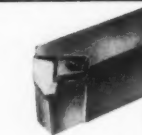
Kendex Style 3TKD



Kendex Style 11PKD



Planer Tool Style 11PH



Planer Tool Style 9PH

## Here They Are

### KENNAMETAL Developments in Mechanically-Held Tooling for Better Production at Less Cost

Kennametal mechanically-held tools are outstanding in their performance, and in the savings they effect, because:

#### THEY ELIMINATE THERMAL STRAINS

The inherent strength of Kennametal is more fully utilized. Harder grades can be used on heavy jobs at coarser feeds.

#### THEY SIMPLIFY TOOL SETTING

Tips can be repositioned, or replaced, without disturbing the tool holder.

#### THEY REDUCE GRINDING COSTS

Procedure is simpler and less frequently required. No steel needs to be ground—only the carbide. Indexing feature of Kennamatic and Kendex tools provides multiple cutting edges between regrinds.

#### THEY LOWER INVENTORY

Fewer tools are required to float a specific job, and only tips or inserts need to be stocked.

#### THEY INCREASE MACHINE PRODUCTIVITY

Down time is minimized because fewer tool changes and adjustments are required.

Our field representatives are fully equipped to help you apply this advanced tooling technique for better production at less cost. Ask them to demonstrate.

The tools illustrated are made in both hands, in various sizes, with Kennametal tips suitable for machining steel, cast iron, and non-ferrous alloys.

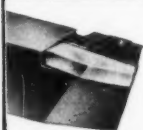
#### Send for Catalog 49

It shows the most complete and diversified line of carbide tools ever offered.



**KENNAMETAL Inc.**

SUPERIOR CEMENTED CARBIDES  
LATROBE, PA., U. S. A.



Clamped-on Style BLH



Clamped-on Style FLH



Clamped-on Style GLH



Grooving Tool Style SVG



"Universal" Face Kennamill



"CF" Face Kennamill



Step Kennamill



"AF" Axial Face Kennamill



**Heard the Word  
that's Going Round?**

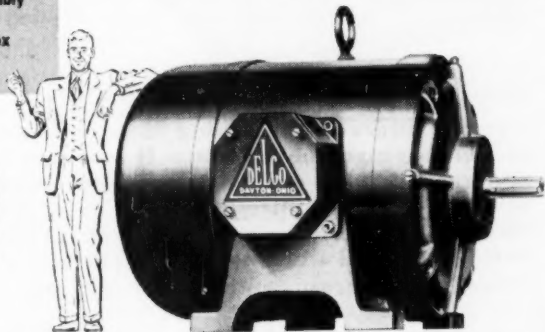
**DELCO PREFERRED!**

- Positioned Bearings
- Delcote Coil Insulation
- Corrosive-Resistant Cast Iron Frame
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- Dynamically-Balanced Rotor and Shaft Assembly
- Water-Tight Conduit Box

**Production Men Have Found the Answer  
to Better Motor Performance**

There's no magic to it—just a motor that's built the way production men want their motors built. And more and more spec sheets carry the message "DELCO PREFERRED" to take advantage of the extra care and extra features that make Delco motors outperform all others. Here are a few of these performance extras:

Why not get all the facts on Delco motors? Phone or write Delco Products, Dayton, Ohio . . . or get in touch with one of the sales offices listed below.



**DELCO MOTORS**

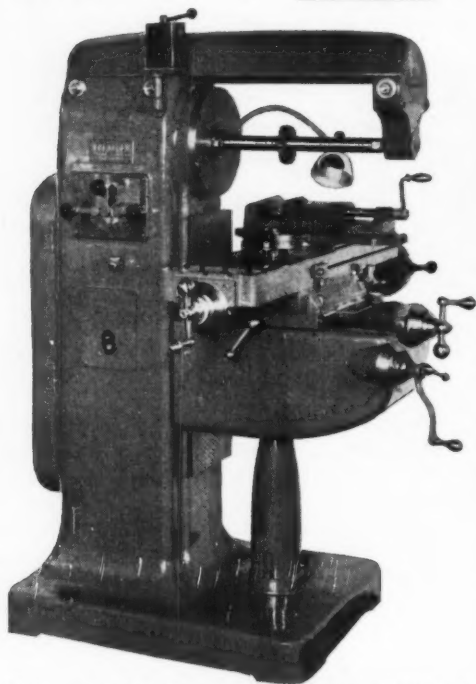
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**SALES OFFICES: CHICAGO • CINCINNATI • CLEVELAND • DETROIT • HARTFORD, CONN.**

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# FULL No. 1 CAPACITY with the NEW INDEX

## Plain MILLING MACHINE



Large size table — working surface 32" x 9". Larger table optional.

Feed instantly reversed without stopping motor or spindle.

Coolant system stops and starts with spindle.

Fully heat-treated, hardened and ground alloy spindle mounted in precision ball bearings.

Ground thread ball bearing lead screws . . .

and many other operating features.

*Please ask for literature on Index Model 60*

The new Index Plain Milling Machine readily meets the needs of the average tool room. However, its built-in accuracy and rigidity plus operating ease also make this machine excellent for the requirements of production shops. Note the compact design, convenient location of each control and the enclosure of all working parts. There are more reasons why Index can increase your output and cut costs.

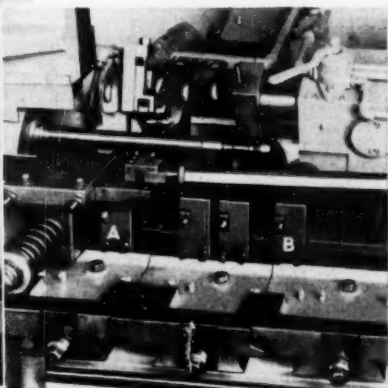
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JACKSON, MICHIGAN



PREPARED BY THE SENECA FALLS MACHINE CO. "THE Lo-swing PEOPLE" SENECA FALLS, NEW YORK



**PRODUCTION COSTS ARE LOWER WITH Lo-swing**



## INTERNATIONAL HARVESTER

KEEPS

MILLING MACHINES  
PRODUCTIVE

WITH

## RUSNOK MILL HEAD

MILWAUKEE WORKS: INTERNATIONAL HARVESTER CO. uses RUSNOK Mill Head as a vertical attachment on one of their milling machines. In this operation, it is milling a boss on the side of an International Harvester Diesel pump housing.

RUSNOK heavy duty Mill Head quickly and easily converts your horizontal mill to do vertical or angular milling, drilling and boring operations. RUSNOK Milling Attachment takes the place of costly, special equipment — uses no valuable space, just install on your present mill.

Write for name of nearest RUSNOK Mill Head dealer. Let him show you how the RUSNOK Milling Attachment can be an important part of all your milling operations.

*A Few Choice Dealerships Are Still Available*

HEAVY DUTY

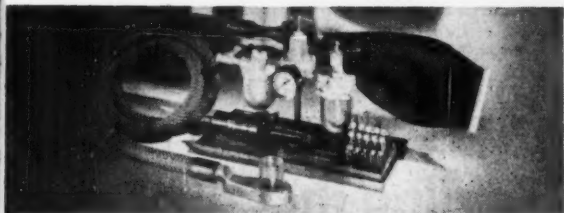
# RUSNOK

ATTACHMENT

**MILLING • DRILLING • BORING**

RUSNOK TOOL WORKS • 4840 W NORTH AVENUE • CHICAGO 29, ILL

COMPLETE SYSTEM INCLUDES DUST ELIMINATION



**W**HEN Jig Grinding is required you can have it quickly and economically with the Vulcanaire. Place in the spindle of your Jig Borer (or Mill).

**AND YOU CAN** . . . locate—finish grind holes in hardened steel to "tenths" at controlled speeds up to 65,000 R.P.M. . . . grind dowel holes—square with a ground base . . . move location of holes in hardened steel blocks . . . grind interchangeable holes in hardened sections . . . grind .032 to  $\frac{1}{16}$ " holes with diamond impregnated laps . . . grind contours and relief with tungsten carbide burrs . . . grind radii in die sections . . . grind contours in gages . . . jig grind large and awkwardly shaped components . . . eliminate jig bushings in tools where close spacing is essential.

**RESULTS!** Jig ground requirements are being designed into tools by the most enlightened engineering departments . . . Jig ground the hardened die, stripper plate, and die holder all fit together . . . uniform clearance means longer runs.

**ADVANTAGES!** the investment is less than for many Jig Boring accessories such as a rotary table . . . the Vulcanaire can be put on and taken from the machine in a few seconds . . . the Vulcanaire is completely portable (all accessories are platform mounted) . . . the system can be used between several machines of various capacities . . . employing both

## JIG GRINDING

with the

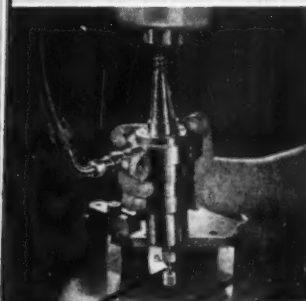
# *Vulcanaire*

the 10,000 and 20,000 series, components with various sized holes from the very smallest to 4" in diameter can be Jig Ground . . . the average Jig Borer operator becomes proficient at Jig Grinding after very little experience.

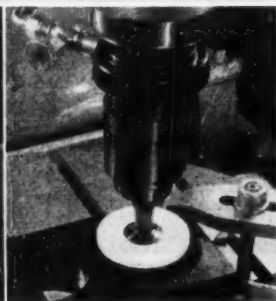
**TOPS IN PRECISION** . . . the Vulcanaire is precision built throughout and is constructed of alloy and tool steel. Super precision bearings, preloaded with our special fixtures are used, with all traces of radial and end clearances removed, resulting in Vulcanaire Jig Grinding to "tenths" . . . for quotation and literature please mention machine tool application.

## VULCAN TOOL CO.

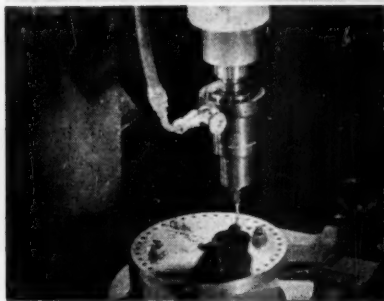
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10,000 SER.  $\frac{1}{16}$ "- $\frac{1}{2}$ " HOLES  
PUT ON TAKE OFF EASILY



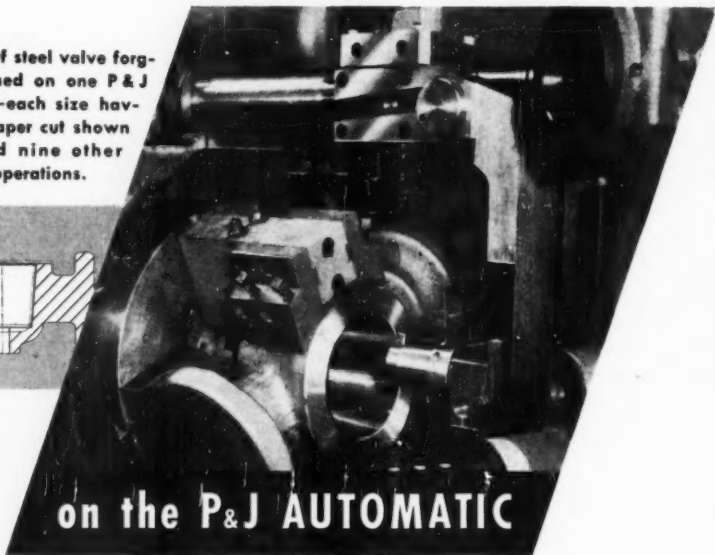
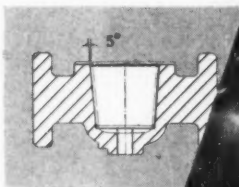
20,000 SER.  $\frac{1}{2}$ "-4" HOLES  
ADAPTORS INTERCHANGEABLE



FOR JIG BORERS OR MILLS

# Sizable job... and the Tooling that does it...

Four sizes of steel valve forgings machined on one P&J Automatic—each size having the 5° taper cut shown below, and nine other close-limit operations.



on the P&J AUTOMATIC

POTTER & JOHNSTON'S tool engineers generally take difficult tooling problems in stride, but this one was a challenge. First of all, the job was big — four different sizes of valve forgings with a mass of steel to break down for the 5° taper, plus nine more exacting operations on each one to close accuracy limits. One master tooling setup plus three sets of chucking fixtures did the trick. P&J economy tooling licked all four jobs on one P&J 6DS Automatic Turret Lathe.

The perfection of this job can be attributed to

P&J's wealth of experience to engineer a sequence of toolings with an eye toward economy. P&J Tooling is the natural team-mate for any of the versatile P&J Automatics — in this case the 6DS. It's a combination that really works, with all the economy-advantages of precision, speed and low-cost operation. We can show you dozens of examples.



An estimate from Production Tooling Headquarters on your sample parts or prints may be the profitable answer to your quantity production problem. Write us for recommendations, and for the Catalog on the 42 series of P&J Automatics.

**Potter & Johnston Company**  
Pawtucket, R. I.  
subsidiary of Pratt & Whitney  
Division Niles-Bement-Pond Company



# Featured in this issue

**Perform Difficult Operations Easier, Faster with Magnetic Chucks**, by H. Louis Purdy. Fast and simplified set-ups can be made with magnetic chucks, also, many types of pieces cannot be held by any other efficient method. The article describes some of the unusual set-ups and some of the more common applications of magnetic chucks. Page .....71

**Manufacturing Intake Manifolds at Solar Aircraft Company**, by Gerald Eldridge Stedman. Many of the manufacturing operations at Solar are original with them and aid in reducing costs. Some of the brazing, welding and soldering operations are discussed by Blue Book's new field editor. Page .....83

**How Manufacturers are Using Broaching to Increase Production and Reduce Costs**, by Professor Herman Reichardt. The author, a retired consulting engineer with well over forty years of service behind him has gathered together a few interesting applications of modern broaching machines. No effort is made to teach fundamentals of broaching, but the author has tried to show what is being done with broaching today. Page .....98

**Plastic Lubricant Feeds Plug Valves Automatically**. The need for frequent lubrication of valves is eliminated with this new energized lubricant. The pressure exerted in injecting the lubricant into the valve powers the lubricant by compressions. Page ....109

**Guarding Problems as Injury Cause**, by L. A. Faulkner. The author analyzes punch press guarding and makes some sane and sound recommendations for reducing the number of punch press accidents which result through improper or poor guarding. Page .....115

**Letter from England**, by Robert Hutcheson, Editor of Machine Shop Magazine. Page 123

**Efficient Gear Inspection in a Gear Job Shop Cuts Rejects, Increases Quality**. During the war Sier-Bath Co. produced over \$3 million dollars worth of gears with only \$8.50 worth of rejects. Their inspection methods are applied to current production. Page .....130

**The Foremanship Forum**, by Edmund Mottershead. This month's article deals with the foreman and his relations with the personnel department. The two must work together on the hiring and firing of employees and the building of better labor relationships. How this can be done is told on Page .....137

**Modern Tools in Action**. Page .....147

**Milling Fixture with Changeable Locating Feature**, by Robert Mawson. Page .....153

**Shop Hints**. Page .....153

**Available Literature**. Page .....159

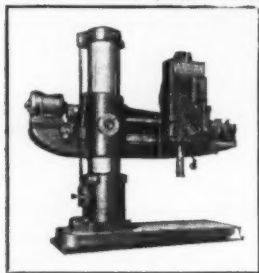
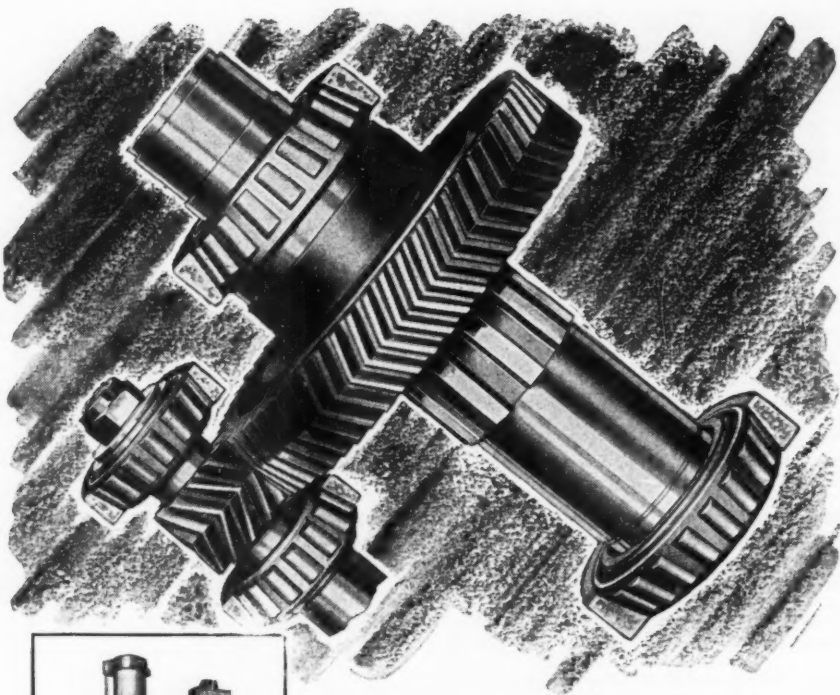
**What's New in Metalworking**. Page ....187

**Products Index**. Page .....280

**Advertisers' Index**. Page .....286

## INTERESTING READING NEXT MONTH:

**First Part of a Series on Tooling for Single and Multi-spindle Automatics  
Holding Devices for Cylindrical Components  
Tooling at Minneapolis-Honeywell**



Radials 7 1/2" dia. col. 9 1/2' arm, to 36"  
dia. col. 12' arm  
General purpose Uprights, 21" to  
32" sizes  
Production Uprights 21" to 28"  
Jig Bore, Portable Horizontal,  
Spacing Table Machines.

**Equal Efficiency of Every Unit  
Makes the Balanced Machine**

## On EVERY JOB you do—

The smooth, chatterless, powerful and durable drive of the Cincinnati Bickford Super Service Radial Drill is a success factor in every job you do.

Driven by 10 splines machined from the solid, the driving gear is mounted on a special continuous bronze alloy sleeve which is carried by anti-friction bearings mounted on close centers.

Herringbone, continuous tooth gears are used for the lower speed ranges—for strength and smooth-rolling action.

The large continuous tooth gear never exceeds 500' peripheral speed a minute, automatically declutches at high speeds and eliminates strains of flywheel inertia on high speeds and on spindle reverse.

Such design and engineering give Cincinnati Bickford Super Service Radial Drills great accuracy and a long life of trouble-free operation.

Write for the detailed bulletin No. R-29 for complete data.

**THE CINCINNATI BICKFORD TOOL CO. Cincinnati 9, Ohio U.S.A.**



# As the Editor ... SEES IT ...

## CAN'T SEE THE BUSINESS FOR THE OBSTACLES

Suppose a cross-country runner strapped a ladder to his back to help him up steep inclines, put hip boots on his feet to get across creeks, and in anticipation of rocky terrain provided himself with ropes, hooks and a sturdy staff; thus attired to meet all obstacles he might not win the race, or even place with the lead of the pack, but with his get-up he will be prepared to face his troubles, and most important of all, his excuse for not winning the race will be incontrovertible. Even so, people will wag their heads sagely and marvel at the youth for having endured to the bitter end in spite of his anchor and drag chains. If he hadn't worried about the obstacles ahead he might have won, but that's neither here nor there.

You say this is all a great silliness?

It is no sillier than a manufacturer I know who sits in his office bemoaning his obstacles to profitable business. And they are tremendous. They are without end. The government is out to get him, his competitors are swindlers, the unions take one look at his round head and sharpen their tomahawks, his customers are dullards, and to top it all—fate's final fiendish blow which sapped his moral strength—his little backyard garden this summer was devoured by potato bugs, tomato fleas and other many-headed monsters.

This manufacturer doesn't do a land-office business; how in the world can he with all his appalling obstacles? His business colleagues shake their white heads and say it's pretty tough nowadays to make a living.

Is this still a great silliness?

Too many manufacturers spend too much of each day's dear time in bemoaning their obstacles and in outfitting themselves with ladders, ropes, and boots when they should be so conditioning their businesses that obstacles are easily, quickly surmounted as they arise. In fact, they court obstacles so that with time they become their constant companions. And obstacles have colleagues whom they'll bring around. What charming circles of cohorts the manufacturers will have then.

On the other hand there are manufacturers to whom obstacles do not exist. They are deaf to the government's antics, avoid labor disputes, admit brazenly the absence of competition (who is worrying about obstacles?) and realize the customer is a smart cookie and give him what he wants. These manufacturers have one-track minds. They improve their products constantly and use every device to make sales; nothing interferes with their program of progress. If business conditions are unfavorable they don't know about it. These manufacturers are doing the things which someone else is saying can't be done. They simply, bluntly refuse to believe that anything can arrest their cross-country jaunt. Beat them to the earth and they bounce back like rubber balls, sink them in the sea and they pop up like corks, bury them deep in the ground and they'll tunnel their way out like gophers. They can't be beat. They see no obstacles.

There is nothing silly in this.

*William F. Schleicher*





## New Electric Eye Machines Speed Ryerson Cutting Service

The multiple-torch gas cutting machine shown above is one of eleven recently installed in Ryerson plants from coast to coast. Equipped with an electronic eye tracing device, these remarkable new machines cut the most intricate shapes swiftly, accurately. The eye follows a simple sketch or blueprint within plus or minus fifteen-thousandths of an inch!

Many manufacturers are saving time and effecting substantial economies through the use of Ryerson flame-cutting. With electric eye machines rounding out a complete flame-cutting service, your Ryerson plant

produces an endless variety of shapes from mild steel, high carbon, alloy or stainless steel. Hundreds of pieces can be cut to the same pattern with almost die-cut uniformity, from steel plate up to 15-in. thick.

The new Ryerson cutting machines illustrate how we are continually expanding our facilities to give you faster, more efficient steel service. We urge you to call us when you need steel in a hurry.

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## PERFORM DIFFICULT OPERATIONS EASIER, FASTER WITH

# *Magnetic Chucks*

by H. Louis Purdy

Machine and Tool Blue Book

How are other manufacturers using magnetic chucks? What difference exists among the various chucks available today? How may they be used to best advantage to conserve set-up time, jig and fixture making time, and loading and unloading time? The author presents an analysis of magnetic chucks and their uses, as well as both common and unusual applications utilizing magnetic chucks.

**T**HE MAGNETIC CHUCK is one of the most useful and convenient labor-saving developments which has come into common use in the modern metalworking field. One of its principal advantages is that it can be used as a permanent fixture, handling a considerable variety of work shapes without the necessity of resetting or changing jigs and fixtures as would be the case when mechanical clamping means are employed; it is also an invaluable device in temporary set-ups where long production runs are not indicated.

The following article presents a number of some of the less obvious applications of the magnetic chuck which may be of interest; some of them will be familiar; others may be sufficiently unusual to be of value, or may suggest still further uses.

### **Magnetic and Non-Magnetic Substances**

All metals can be arbitrarily divided into two groups—magnetic and non-magnetic. Of the magnetic substances, there are two sub-divisions, known as Ferromagnetic and Paramagnetic substances. The Ferromagnetic group is comparatively few in number, and includes iron, steel, cobalt and nickel, all of

which are attracted by a magnet. Iron loses its magnetism, however, when heated to a critical temperature of about 700° C. (1292° F.); steel has a similar characteristic. Various alloys of iron or steel, of course, vary the magnetic properties of the base metal; manganese steel, for example, cannot be magnetized. Paramagnetic substances are those which are only slightly attracted by a magnet. These include aluminum, platinum and manganese.

A magnetic chuck consists primarily of a body, containing the coils, and a face plate, which is the magnetized element that holds the work; a third element consisting of an auxiliary plate that fits over the face plate may be added, if need be, to hold work of irregular shape. The chuck is activated by means of d.c. electric current flowing through the coil, which sets up magnetic fields in the steel core. The resulting lines of force penetrate the face plate and the work.

### Types of Magnetic Chucks

Standard magnetic chucks consist of two distinct designs—the rectangular and the rotary type. Each has its particular advantage, as will be pointed out. Generally speaking, rectangular magnetic chucks are suitable for use on surface grinders, for light cuts on planers and shapers and milling ma-

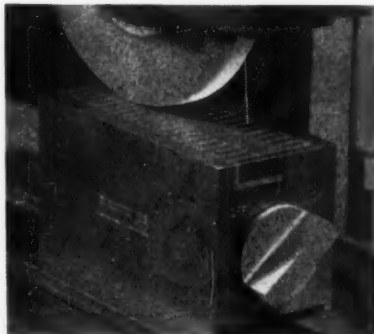


Fig. 1. A magnetic chuck holding a thin piece of metal for grinding. This chuck can also be used on machine tables for holding work for wet or dry grinding.

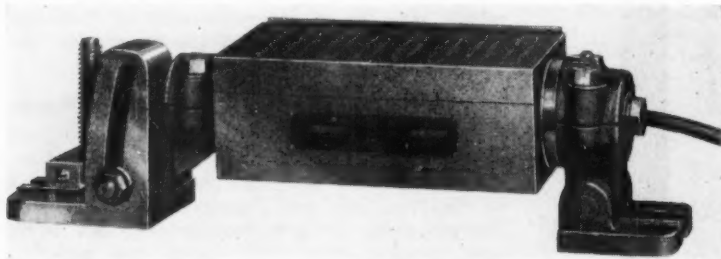
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chines, and for similar other light machine operations. Smaller rectangular chucks are easily carried about from one machine to another in the shop, and are extremely useful for holding work in hand finishing operations, like polishing, scraping and similar jobs. They also have the advantage of using on surface plates for inspecting and testing purposes. Their use in such applications eliminates the need of vises or clamps which could distort the work or interfere with the mobile parts of the machine tools being used.

Rotary magnetic chucks are suited

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Fig. 2. This type is useful in grinding formed tools, for simple or compound angle work, and for tool dressing. Chuck can be bolted permanently to the grinder table.



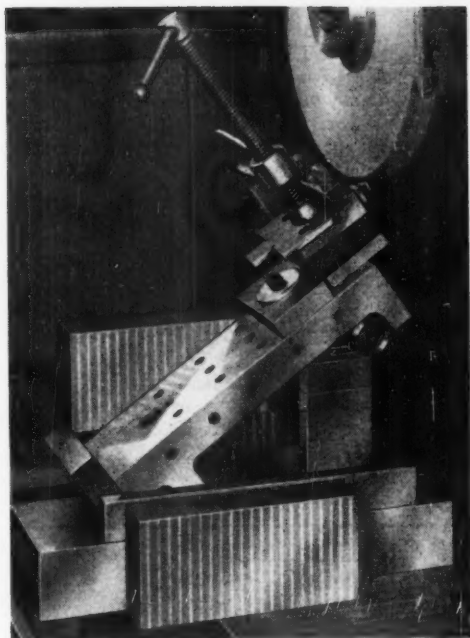


Fig. 3. Example of involved set-up with magnetic parallels. Note tiny work piece held at the exact angle for grinding on the wheel directly above it. There are no welded sections in this set-up. C-clamp and jig plate are stock items.

for grinding operations, light cuts on lathes and for other light machining operations. They have the advantage of holding thin work pieces which could not be gripped by the jaws of an ordinary chuck without danger of distortion or permanent damage to the work.

The permanent magnet type of a rectangular magnetic chuck is that illustrated in figure 1. This type of chuck is especially convenient for holding small or thin work in tool-making and manufacturing or for inspection uses. It eliminates the need of awkward clamping devices for many jobs. The magnetic poles in the top of this chuck are spaced closely so that thin iron and steel work can be held firmly for the necessary machining operations. The chuck can also be used on machine tables for holding work for wet or dry grinding. When the control is

turned to On, the work is held firmly on the chuck and if the chuck rests on a magnetically conductive surface, the chuck also is held firmly to this surface. The work and chuck are both released when the control is turned to Off. The chuck can be used on its sides and end as well as on its base, but it is not held to a magnetically conductive surface when used on its sides.

### Time-Saving Advantages of Magnetic Chucks

Another type of magnetic chuck is shown in figure 2. This unit is a time-saver in the grinding or machining of formed tools, simple or compound angle work, and carbide tipped or steel tool dressing. This type of magnetic chuck is really a precision grinding fixture, ground all over, with a magnetic surface which can be swivelled to 90° on either side of horizontal and

can be tilted to a maximum angle of 14°. Provision is made for rigid clamping at any desired setting.

This particular unit is designed to utilize the full table capacity of a 6" x 18" (No. 2) surface grinder or its equivalent; the chuck may be used as an accessory for intermittent use by mounting it directly in place in the face plate of the conventional rectangular chuck normally used on this type of grinder. It can also be bolted permanently to the grinder table.

A particularly interesting application showing the almost infinite variety of uses to which the magnetic chuck can be put is shown in figure 3. This shows a difficult set-up using magnetic parallels. It will be noted that there are no welded sections in this set-up; the jig plate and C-clamp which are held by the magnetic parallels are ordinary

stock items. Yet the tiny work piece is held at the exact angle for grinding on the wheel directly above it. The reader will recognize the difficulty which would be involved in setting up this work piece without the use of magnetic parallels. It would require the construction of a costly and time-consuming special fixture which might use up hours or whole days in its manufacture.

The usefulness of magnetic chucks in holding large, irregular-shaped pieces is clearly shown in the application in figure 4. The large power cylinder head being milled in this set-up is a heavy, cast iron part requiring considerable tooling expense for correct holding. Ordinarily, this operation would be performed on a boring mill.

Three innovations are incorporated simultaneously in this method of ma-

## HOW ARE YOU ON GRINDING?

By Professor Herman Reichardt

Count ten points for each question answered correctly. 90 to 100 is excellent; 80 to 90 is very good; 70 to 80 good; 60 to 70 is fair; and below 60 . . . oh, dear me!

1. Which abrasive is a product of the electric furnace?  
**Silicon Carbide; Emery; Garnet; Flint** \_\_\_\_\_
2. Most precision grinding is done at a surface speed of:  
**1000-2500 ft./min.; 3000-4500 ft./min.; 5000-6500 ft./min.** \_\_\_\_\_
3. The coolant least suitable for roll grinding is:  
**Soluble Oils; Soda Solutions; Mineral Seal Oils** \_\_\_\_\_  
**Soap Solutions** \_\_\_\_\_
4. Fatigue breakage of ground surfaces almost always start from defects or stresses existing:  
**In Core; Between Core and Surface; On Surface.** \_\_\_\_\_
5. Surface scratching is not caused by a wheel that is:  
**Too Coarse; Too Hard; Improperly Dressed; Too Soft.** \_\_\_\_\_
6. Disc wheels of vitrified bonded abrasives can operate at a greater speed than resinoid bonded wheels.  
**True; False.** \_\_\_\_\_
7. Emery is often used for fine hand finishing.  
**True; False.** \_\_\_\_\_
8. Rubber bonded grinding wheels should always be used with a coolant.  
**True; False.** \_\_\_\_\_
9. Aluminum Oxide mounted wheels are used for grinding of materials of low tensile strength.  
**True; False.** \_\_\_\_\_
10. Burning of internal grinding work indicates that a softer grade of wheel or an increase of work speed should be used.  
**True; False.** \_\_\_\_\_

ANSWERS TO QUIZ ON PAGE 260.

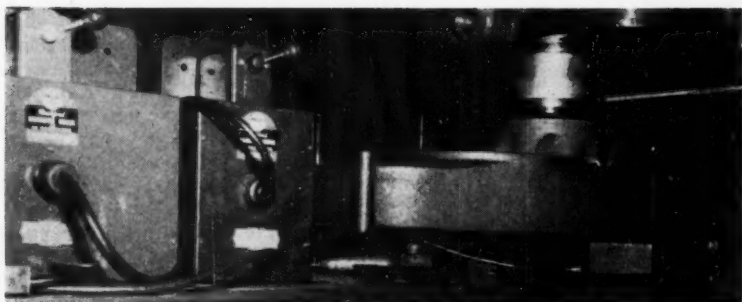


Fig. 4. Magnetic chuck holding large cast iron cylinder head on table of planer type milling machine. Chuck is under work piece; two end stops hold piece rigid and prevent possible sliding.

chining this part; a planer type milling machine supplants the boring mill; carbide tools are being used in place of high speed steel; a magnetic chuck has eliminated all clamps, wedges, bolts and other cumbersome set-up devices.

When milling was substituted in place of the boring mill, the cutting forces would have risen somewhat even if the change had been restricted to the standard materials. With the application of carbide tools, however, the metal removal rate increased from 5 to 6 cu. in. per minute to 35. The horsepower increased in the same ratio. The semi-steel casting could be milled at  $\frac{1}{2}$  h.p. per cu. in. per minute rate. When milling replaced turning, and carbide replaced high speed steel, the

holding problem was considerably complicated; the magnetic chuck, a decided help to carbide technicians, was used to hold the part against all forces.

As is seen from the illustration, the chuck is placed under the cylinder head with two end stops that hold it rigidly and prevent any possibility of sliding. The magnetic chuck permits loading and unloading operations to be simple and efficient as well as low in cost, particularly where expensive tooling is not justified, as in short run jobs.

### Various Special Applications

As is already obvious, the applications to which magnetic chucks can be put are only dependent upon the ingenuity of the individual user. This

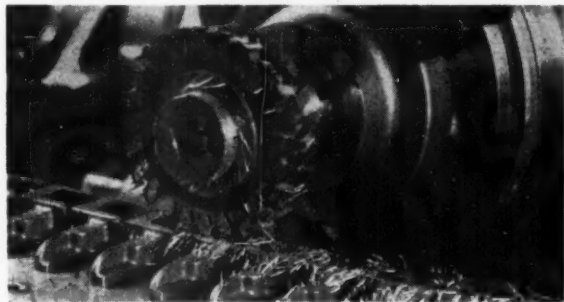


Fig. 5. Magnetic chuck holds 23 cast iron yarn supports which are slotted on a milling machine. Previous method of holding involved the use of clamps which exerted pressure in 13 places. Only 6 pieces were milled by previous method.

will be clarified in certain unusual or out-of-the-ordinary uses which follow.

The operation shown in figure 5 is slotting cast iron yarn supports. The width of the slot must be held to close tolerance, with the corners sharp. The old method consisted of milling six pieces at a time on a conventional milling fixture, with ordinary slotting cutters. Pressure was applied by clamps in thirteen places, in order to hold six pieces firmly. It was difficult to set the clamps satisfactorily because of the small size of the castings. With the use of a magnetic chuck and B-C cutters, 23 parts were milled at a time at a milling feed of 14" per minute, at a cutting speed of 250 s.f.p.m. or 318 r.p.m. The cutting time was 500 pieces per hour, as compared to the former time of 100 per hour. The actual operation consisted of milling slots .067" x .657" x 1"; the cutters were B-C interlocking side mills, 3" x .657" x 1 1/4". The tool life was 3300 pieces per sharpening; the

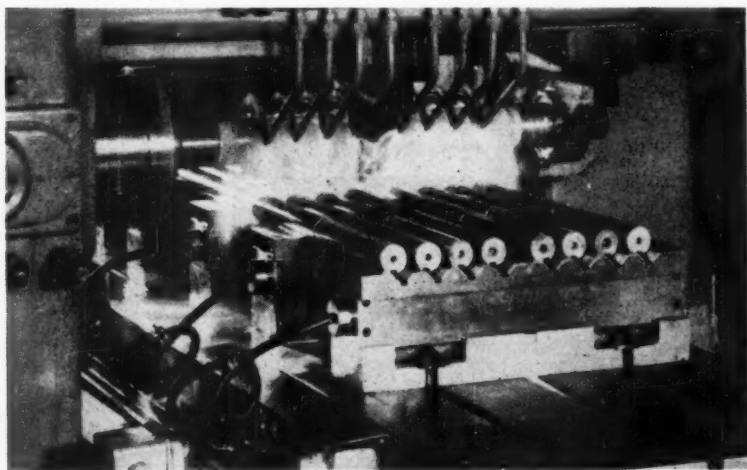
former tool life amounted to 1700 pieces.

One of the most interesting applications for which magnetic chucks have been used is depicted in figure 6. The picture shows the holding of eight shafts. Four keyways 5" long, 3/8" wide, 3/16" deep are milled in each shaft. The shafts are 1-5/8" diameter, with ends 1 1/2" in diameter. The cutters used are 6" diameter staggered tooth h.s.s. side mills. The feed rate is 5" per minute, and rapid traverse is 300" per minute.

As can be seen, a single fixture can be made adaptable to a wide range of shafts with one or more diameters. The deep magnetic penetration, accomplishing extreme holding power with low voltage, makes possible the use of simple and versatile fixtures. Production economy is gained milling either large quantities of a single shaft, or moderate runs of mixed sizes. The magnetic circuit is directed through the fixture and work-piece so that

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Fig. 6. Keyways are being milled in eight shafts in one pass. Each shaft will contain four keyways 5" long, 3/8" wide, 3/16" deep.





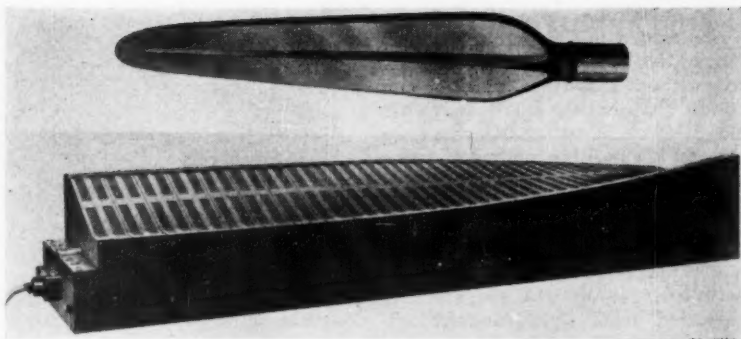


Fig. 7. Special chuck made to fit airplane propeller blades. Operation will consist of planing and milling. Note curve of chuck surface made to fit exact size of propeller.

• • •

little magnetism reaches the cutter, making the tendency of chips to cling very slight. Coolant keeps the cutter practically clear of chips. When the work is released—i.e., when the magnetic power is disconnected, chips lay loose and the fixture can be brushed clean in the usual manner.

In such a set-up, magnetic chucks can be connected to operate automatically with the milling machine. The primary circuit of the rectifying unit can be interlocked with the control

circuit of the spindle motor, or can be interlocked with limit switches to synchronize the circuit with movements of the machine table.

Another specialized application for magnetic chucks which was developed during the war for irregularly shaped parts is the special magnetic chuck developed for holding large propeller blades for planing and milling (figure 7). Prior to the use of magnetic chucks in this operation, tabs were welded around the periphery of the propeller blades; these tabs were securely held by means of a mechanical device; after the planing and milling operation, these tabs were released and the blade was polished. By the use of this magnetic holding device, it was simply necessary to place the propeller blade on the surface of the chuck and close the switch. This chuck measures 71" long, 15" wide, 11" high, and weighs 3300 lbs.

### Magnetic Holding Devices

A variation of the permanent magnet type is a magnetic holding device

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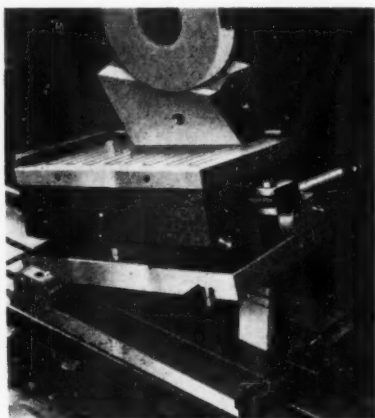


Fig. 8. A magnetic holding device used for machining parts at an angle. The work piece is held by magnetic attraction on a permanent magnetic chuck.

used for machining parts at an angle, figure 8. Added to the precise angular accuracy, the work-piece is held securely, without distortion, by magnetic attraction on a permanent magnetic chuck. It is used with standard gauge blocks and is a positive method of making fast angular set-ups. In using this device, the operator looks up the desired angle in the table of constants which is furnished. This table indicates the proper gauge blocks for using with each set-up. The gauge blocks are selected from any standard set. The blocks are then inserted between the roller on the top plate and the base of the unit, and the set-up is ready for the applying of the magnetic power. Parts requiring unusual or off-set angles may thus be machined without further set-up or intricate clamping devices or jigs.

Other devices which increase the utility of all types of magnetic chucks are the magnetic parallel and the magnetic V-blocks, figure 9. Such tools are especially useful in grinding or otherwise machining parts of irregular shape, where it is desired to carry the chuck's magnetic holding power well above the face plate level.

The use of magnetic chucks, while common practice around most modern plants, requires the use of considerable ingenuity and inventiveness in preparing specific set-ups. The use of these

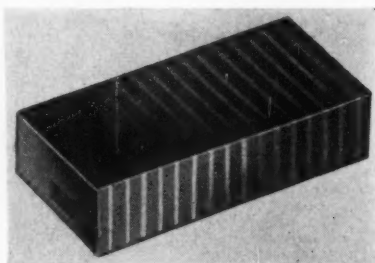
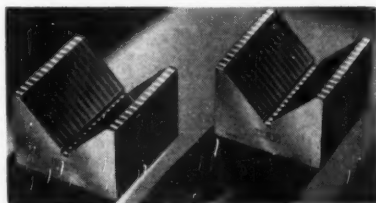


Fig. 9. (top) An example of a magnetic parallel; (bottom) magnetic V-blocks. Both devices increase the efficiency of magnetic chucks.



helpful devices will expedite and facilitate not only set-up operations but the actual machining of the parts themselves.

The author thanks the following companies for the use of photographs: figure 1, Brown & Sharpe Mfg. Co.; figures 2, 3 and 9, Taft-Peirce Mfg. Co.; figures 6 and 6, Sundstrand Magnetic Products Co.; figure 7, O. S. Walker Co., Inc.; figure 8, Omer E. Robbins Co. THE END.

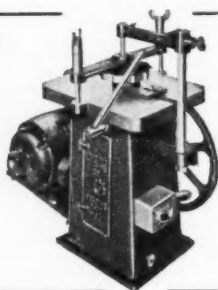
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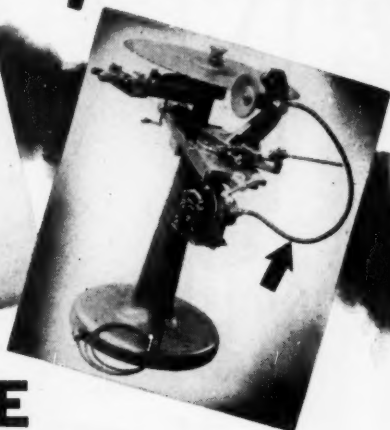
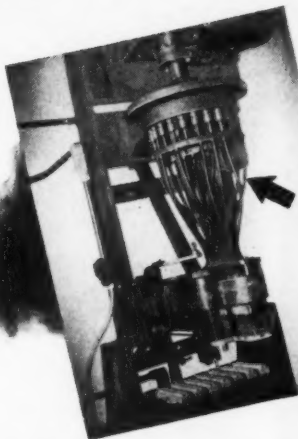
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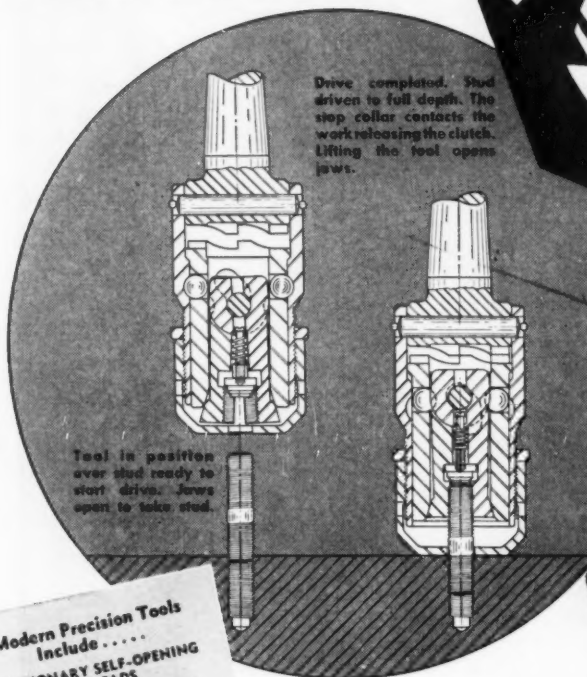
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## MANUFACTURING INTAKE MANIFOLDS

### *at Solar Aircraft Company*



by Gerald Eldridge Stedman

Blanking, forming, soldering and welding, and other operations are performed in producing intake manifolds. Many of the manufacturing ideas are original with Solar. Production is high due to interesting tooling and production short cuts, many of which have been suggested by employees. Silver soldering is fast and efficient, worthy of study.

**S**OLAR Aircraft Company, San Diego, California, and Des Moines, Iowa, produces jet engines components, exhaust manifolds, afterburners, intake manifolds, fan blades for oil cooling towers, and related stainless steel parts.

The group of buildings which make up the San Diego plant have a total floor area of 377,000 sq. ft. They are favorably situated on a 17-acre tideland property on the harbor shore line at the city's center. It was in this plant that Lindbergh's "Spirit of St. Louis" was built.

My visit to Solar-San Diego was my 1032nd plant visit since 1942, and I am indebted to Methods Analyst J. N. Willits for his plant guidance. He told me that the plant employs 1,244 workers and that more are constantly being added since the company has a healthy backlog of orders. Supervisional ratio is one to 20. The safety record is well below the national average; the frequency ratio being 3.8, and days lost per 1,000 man hours, .271.

Solar developed and patented a new, faster, lower-cost and more accurate method of forming stainless steel.



In the Sol-A-Die process, only the final part is die-designed. Then, laminations of cheesecloth and wax are placed to follow the contours of this finished die. They soon stiffen into a pattern sheet which can be separated from the finish die and unfolded to the desired stage. Since this pattern sheet is virtually non-stretchable and non-shrinkable it can be de-formed to serve as the matrix of a stage die pattern which throughout its surface is exactly the same as the final die in differential areas, lengths and widths, but which has greatly modified contours and radii. Any desired number of intermediate stage dies can be produced by this method. The slopes of the first stage pattern determine the grid pattern of the final part.

This Sol-A-Die technique provides a rapid, free-from-mathematics solution for many a difficult forming problem. Instead of the successively deeper draws of conventional forming, Sol-A-Die employs two far simpler steps. One, in the first relatively shallow die, a blank of adequate size is deformed to the full absolute area which will be required in the final part. Two, subsequent Sol-A-Dies merely fold the prepared full area blank into its final form. The result is a more even distribution of metal, less thinning, less speed hammer work, less intermediate annealing, less hammer time and less rejecting stampings. In fact, the Sol-A-Die method produces the most complex contours, radii and angles, usually without need of any inter-stage annealing.

Solar makes extensive use of jigs and designs most of its own tooling. Its large tool shop is most thoroughly equipped. I noticed a Keller, Pratt & Whitney Type B2416 profile machine and a P&W jig bore No. 24-2A. This boring machine was mounted on inertia blocks which eliminate all vibration, an idea of F.F. Demers, one of

Solar's tooling engineers. The jig borer floats completely, suspended on springs. A similar suspension is used on Solar's battery of drop hammers, and vibration is so well minimized that a brim-full glass of water can be placed on the floor in front of these hammers without spilling at their heaviest stroke.

Many novel machine developments were noted in the plant visit. A threading machine had been converted into a tube cut-off using air cylinder control on the collet. Automatic clamping of the collet, the rigging of a Delta cut-off saw with an abrasive cut-off wheel, and counter-weighted tail stock, make possible the cut-off of one-foot lengths of An-WW-T-858 stainless  $2\frac{3}{8}$ " o.d. .050 wall at the rate of 2,500 pieces/8 hours, as compared with the former manual operation of 1,200 pieces/8 hours. A Solar development in rotary shears using an air-operated clamp and motor-driven action can cut any gauge of stainless up to .078 at the rate of 15'/minute.

By the very nature of its production, most Solar fabrication is in job lots. Although more lines are being set up, at the present writing the only line flow of mass production in the plant is that of the Pratt & Whitney intake manifolds. The Pratt & Whitney line turns out three engine sets plus six sections per day; each engine set has seven different sections and 28 pipes.

The intake manifold line is U-shape, covering a 125'x33' area which contains 55 operations in sequence. Seldom can one find such unusually compact line flow within so small an area. It is distinguished by having groups of related sub-assembly activities staggered on either side of a roller-type gravity conveyor line. Line foreman W. J. Hutts accompanied my tour. His line operates with 23 people, including one lead man.

Blanks for intake manifold pipes are cut from SAE No. 4130 chrome-moly steel. .035-gauge sheet stock is square-

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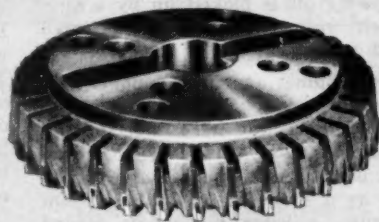
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*Third:* Compared with previous tools, the new cutter operated at two-thirds the tool cost, and reduced down time from cutter changing to one-third the former total.

*Fourth:* The new cutter also decisively outpaced three late model competitive cutters on tool cost and down time from cutter changing.

*Fifth:* Because of the smooth operation of the new cutter, feed rate of the machine was stepped up from 44" to 60".



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Fig. 1. Excess material left on half stampings is trimmed on nibblers which were designed during the war years to trim large stampings for the B-29 manifold. Hardened steel cutters can cut any contour at 3,500 strokes per minute. A stellite tip guide is used to adjust the nibbling to any gauge metal.

• • •



cut on a 6' Cincinnati shear. These blanks go to forming where half sections are formed in Chambersburg 4 T drop hammers. There are seven Chambersburgs in this department varying from 24"-30" to 48"-60". I noticed one free-dropping air hammer of Solar's own design. Solar has originated unusual blank oilers. A shallow pan of drawing oil is picked up by a bottom-felt roll operated by a small geared motor.

Drop hammer forming is done with dies made to the Sol-A-Die method. Another interesting technique of intermediate staging uses a lead cushion which is poured in the die and distributed as a make-ready build-up. On long runs a brass blanket is placed between the lead and the blanks, and severe radii often calls for a further rubber cushion on the first strike. In this manner, gradations of staging are accomplished in difficult formings.

Excess material left on the half stampings is trimmed on unusual nibblers, figure 1, developed by L. W. Russell, Solar Development Engineer. These horn-design nibblers are mounted on a C-frame. Hardened tool steel cutters, cut and ground to proper pitch, can cut any contour at 3,500 strokes/

minute. A stellite tip guide is used to adjust the nibbling to any gauge metal. In some work these nibblers follow a template guide and the trimming operation is like cutting butter with a knife.

After trimming, half stampings are degreased and dezincized. The Solar processing department is unusual. Twelve circularly-arranged tanks are served by a 5T boom and mast mounted in a center cab which has 360° rotation. This centralized sequence of tanks serves every part-cleaning detail except vapor degrease. The intake manifold stampings are degreased by a Kelite solution of unusually strong caustic composition.

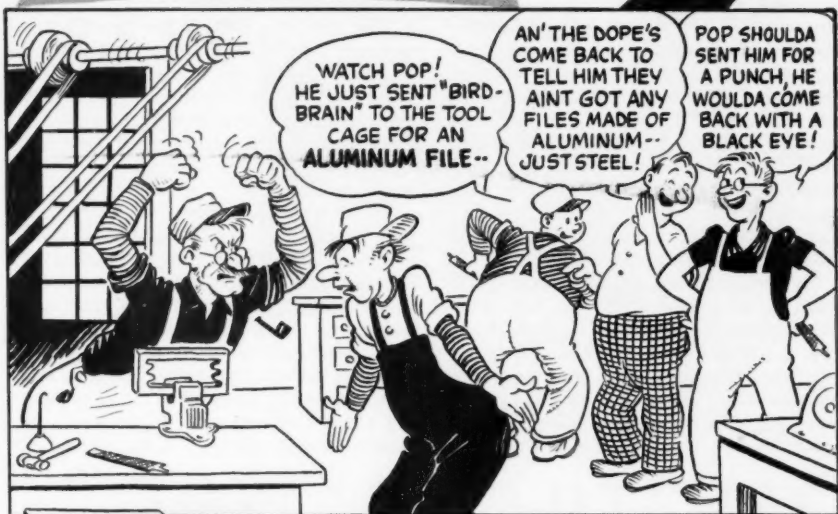
Solar has developed a pickle basket which will stand any temperature used in degreasing, descaling and defluxing operations. This 36"x54" bale-dimension basket is constructed of stainless tubing over black iron pipe for strength and has a hot bar hook hold of stainless channel. Its body is stainless strips. By its design, bottom bowing is eliminated.

From process, these parts go to stamping stores where they are drawn on for the intake manifold line.

All parts, figure 2., involved in the assembly of the intake manifold sec-



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tions—half stampings, braces, bracket assemblies, adaptor assemblies, clips, flanges, inserts and nuts, retainers and nuts—are tote-trucked to the beginning of the line and move along the line on a roller conveyor. The varied stations on both sides of this conveyor now assemble 90 sections/8 hours, and are capable of doubling this number.

At the line's beginning, half sections are mated and tack and seam welded by AWS-A.S.T.M. gauge 60 rod. The tack welding uses interesting vise fixtures with cam clamps which is an example of the many ingenious and unique hand tools developed by employees on the line, figure 3. Many have won suggestion awards.

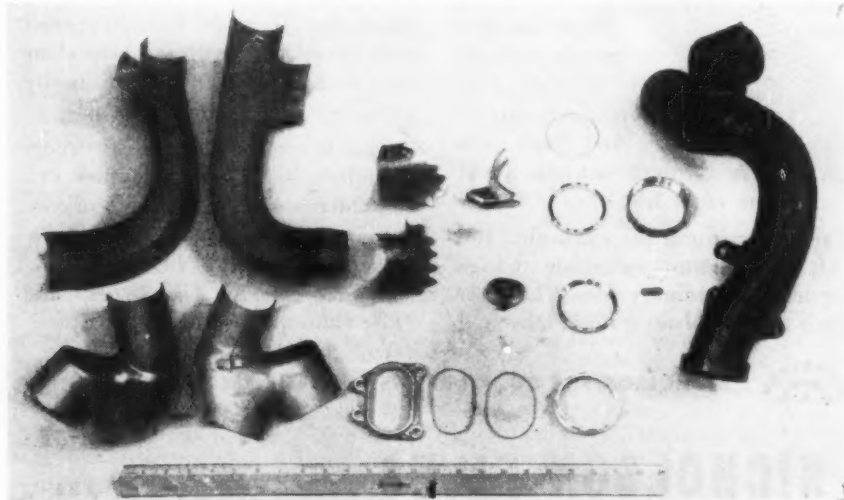
Five welders work on the line. Their work is complicated by the trap outlets required by two of the pipes. However, a jig has been developed to position the required pipe and trap for seamwelding. Traps are scribed in this same jig, the scribe line serving as a guide for a roll-cut, facing and burring

operation. Before the trap and pipe are seam welded, spacers on the fuel trap to hold the inner pipe  $\frac{1}{8}$ " from the fuel pipe to maintain dimensions and supply. This is accomplished by laying a template inside and spot welding through the template.

The welders flatten the seam areas to near-metal thickness by peen pounding, round and shape the two retainer ends to 2.585" o.d. with a -.055", then send the pipes to processing where the weld seams are sandblasted in an American Foundry Equipment Company sandblaster.

The work then goes to heat treat and is annealed at 1250° F for 30 minutes in a gas-fired Knapp batch-type furnace using L&N Micromax controls. Here another Solar development was noticed—a three-arm tong manipulated from overhead monorail. It was mounted on a self-closing spider design, and was developed to lift hot rings weighing some 200 lbs. which are also annealed in this battery of furnaces.

Fig. 2. Trap outlet pipes are assembled from 4 stampings, 2 braces, flange, bracket, adaptor boss, 3 silver solder rings, 2 nut couplings, retainer ring, insert nut and clip.



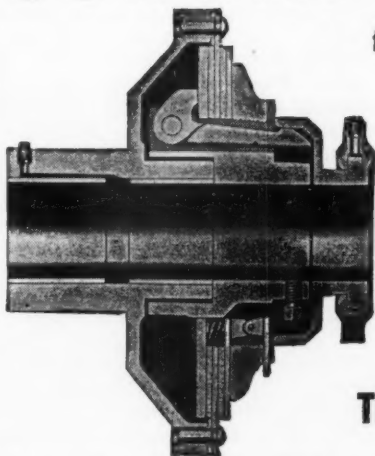
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*Fig. 3. Jig positions pipe and trap for seam welding. Operator performs 8 separate operations on 90 sections per day. She seizes section ends, locates braces, clamps braces into place and peens them closer to the section, spotwelds 30 spots, jigs and scribes for spotweld location; spotwelds another 35 spots and handpeens.*

• • •



Heat treated pipes are pickled in DuPont Hydride caustic pickle, cycle time 20 minutes. A cold quench is followed by a hot (215°F) rinse. Though I have seen DuPont Hydride used quite prevalently in steel mills, I have seldom seen it used in operations such as that of Solar. After rust ban and vapor degrease, the sections come again to sand-blast and weld inspection. Welds are repaired until 100 percent approved. Solar's productive scrap loss involved in welding runs less than 0.05 percent.

The sections are returned to the Pratt & Whitney line where they are placed in a Solar-designed expander and sized to restore the diameter within a -.005". This expander operates on a 12" cylinder using 90 lb. pressure. A sizing ring slipped over the mandrel accurately controls the limits. Development of this expander increased production over 1,000 percent over the old manual method.

The ends of the intake manifold are rounded and strain-broken, as elongation, occurring with the weld, must be stretched for the installation of chrome-moly gussetts. These gussetts are serrated to effect better anchorage. 67 Acme spotwelds attach the gussetts to the pipes. Remarkable individual pro-

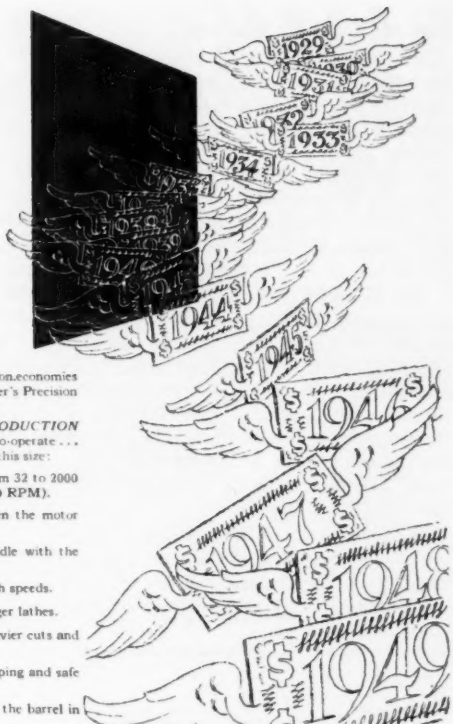
duction was observed here. One girl operator actually sizes, elongates, fits the gussetts, spot welds and hand forms where necessary 90 pieces/8 hours.

The gussetts are then fluxed with Handy Harmon silver solder flux and soldered with Easy Flow No. 4 silver solder. The gussetts's scallops are silver soldered along a 1/4" serrated contour in a ball and socket vise holding fixture with knu-lok pliers on the end and a T-handle positioning control. Solder flame also anneals the spot welds. The work is then thoroughly cleaned with 60 grit sand to get a 100 percent bond on which to mount a flange.

Here one operator takes over for a series of operations. First, he swages the two retainer ends of the pipes and the port ends on which the flange is to be mounted, in a Solar swaging hammer with floating dies. Next he slips two 836-2 silver solder rings over the port end and fluxes and positions the flange. The flanges are branded according to the section on which they are to be mounted. Finally, the operator uses a Solar-developed elliptical jig mounted on an expander to force the section metal to the flange. He accomplishes all these operations at the



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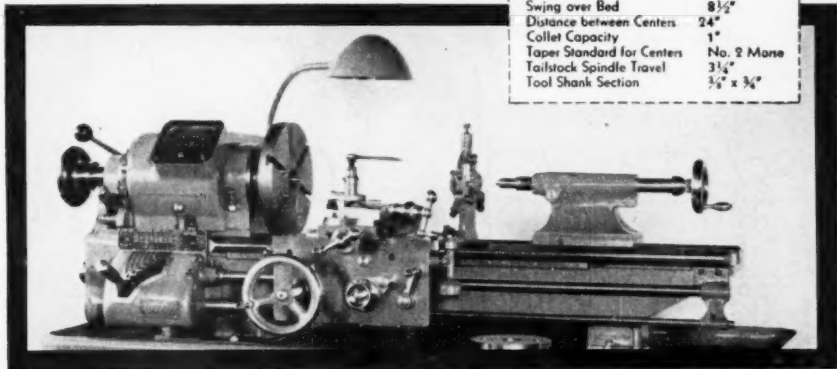
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## SPECIFICATIONS

Swing over Bed	8 1/2"
Distance between Centers	24"
Collet Capacity	1"
Taper Standard for Centers	No. 2 Morse
Tailstock Spindle Travel	3 1/4"
Tool Shank Section	3/8" x 3/4"



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rate of 90 pieces/8 hours.

The pipes next go to a turn-table jig where a bracket is installed. On one side of the jig a loader fluxes the bracket, jig-positions the bracket and clamps the pipe in place. He turns the jig and loads another section on an identical fixture while the operator on the other side arc tacks the flange in four places and silver solder tacks the bracket.

The bracket is then finished brazed. Excess port end and gussett metal is sawed off to 1/16" of the flange face and the work is wire-brushed and burred at flange top. The flange is fluxed with a special gun and dipped in a damming compound. The sections are placed by the Tocco induction furnace to form a bank for morning operations.

The flange is induction soldered in the Tocco, figure 4. The time cycle is 80 seconds. The induction furnace melts the silver solder ring and the flux, and

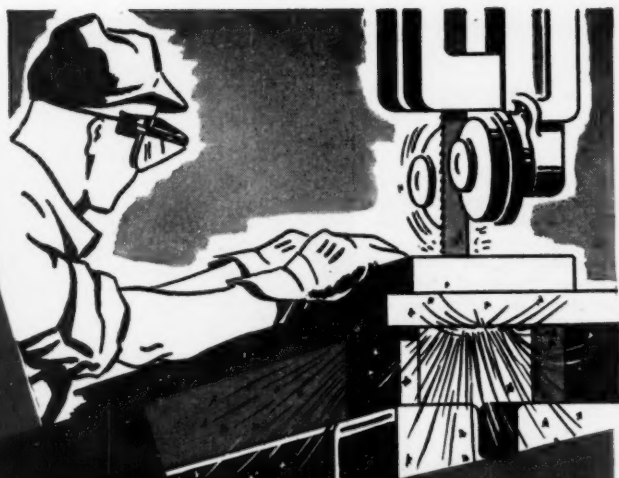
the melted flux pulls the solder through to achieve the required better-than-80-percent bond. The damming compound prevents the silver solder from dripping and shorting out the furnace coils. The furnace operator adds extra silver solder where required. Another man inspects the furnace soldering and repairs when necessary.

An overnight soak in Kelite removes the flux. After a spray wash the pipes again go to silver solder inspection and torch repair. Next aligning jigs check the bracket position and blower end cut-offs are scribed.

The flange and the bracket faces must be on a plane, and they are ground on a Bridgeport Horizontal with a 30" wheel of 14 segments. The grinding is inspected to .003". Both the flange and the bracket face must micro 60 finish or better. Hand clamp fixtures are used on the Bridgeport on an 84" bed. One engine set is taken off in seven fills. This requires four jigs and 22 opera-



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Fig. 4. Flange is silver-soldered to section on Tocco. This is a difficult induction operation as the section-gussets and flange are different materials and different gauges. Also, the flange is elliptical, a difficult shape to put on the furnace.

• • •



tions finish 90 pieces/day. Cinncool is the coolant used. Dial indicators measure height, radius, flange thickness, flange and bracket thickness and also flatness on the whole section. There must be absolutely interchangeability. Dings or dents are corrected with hand peening.

After grinding the sections are jigged and a bracket hole is drilled with an inverted Delta. The jig also checks the bracket for length. Then the bracket hole is burred inside and out and countersunk.

Now the retainer ends must be cut, and the just-drilled bracket hole acts as a positioner in another jig which feeds the ends into an abrasive cut-off wheel. This jig is on a swivel so that both ends may be cut off in one loading. Formerly the method was to scribe a line, roll cut and face by hand. No particular limit was obtained. The limits are now .010" and production has been increased 500 percent.

The retainer ends are fitted with a retainer nut and a retainer ring. This is done by slipping on the nut and a silver solder ring. Then the retainer

ring is slipped on and the retainer end expanded to the ring on a Solar-built expander similar to the one described in the flange-positioning operation. The pipes are then jigged, and the retainer rings tacked with three spots by a Federal resistance welder. Six more spots are put on the rings by a Taylor Winfield.

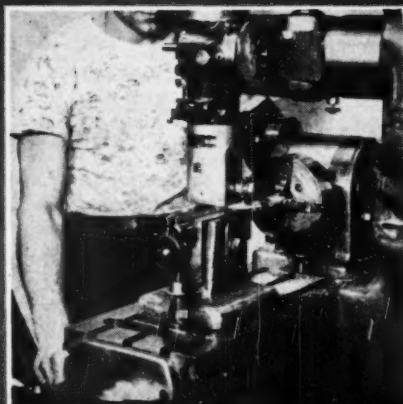
The retainer rings are also silver soldered on a Westinghouse induction furnace, figure 5. A reversible jig feeds both retainer ends to the coils without reloading. A spring hook developed by one of the department employees holds the retainer nuts away from the heat.

The four holes on each port end flange are spotfaced on an inverted Delta which has been converted into a spotfacer. With the dial indicator set at zero, a plug is slipped on and automatic dimensioning is accomplished without using the mike.

Six pipes in each engine set get an adaptor. These pipes are jig-drilled with a 17/32" hole, and the adaptor is silver soldered on. Pipes with blower ends are fitted with trap nuts and clips and silver soldered in the open.

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Fig. 5. Induction silver soldering retainer rings. Operator solders 132 rings in 3 hours, 45 minutes. Torch silver soldering retainer rings to section ends used to require over 8 minutes per section. With the induction furnace a bond is obtained every 26 seconds.

Flux and oil are then bathed off in a gas-fired Kelite tank which is air-agitated like an automatic dish washer. A monorail hoist transfers the sections from their 180° F bath into a cold-water rinse.

Lastly, the threads in the adaptor are chased, the excess silver solder is removed and the work is burred. A collapsible manually-operated cutting tool gives slight radius to the adaptor hole. All burring tools are T-handle hand tools, but unique and special ones have been developed to get into hard-to-reach places. Particularly unique was a plier adaptation which burrs the top and bottom holes simultaneously.

A 100 percent inspection of flange thickness, flange and bracket plane,

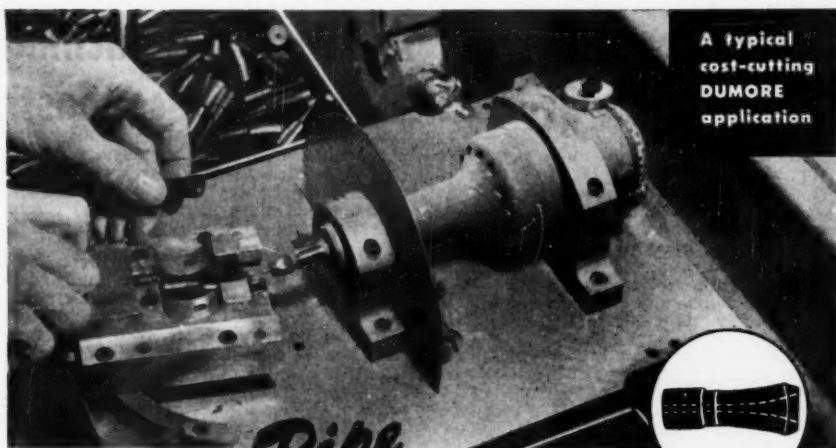
flange and bracket face finish, pipe alignment and finish is accomplished on a special jig. Pipes which do not inspect 100 percent perfect move to a rework station on the line.

After final inspection the work is trucked to sandblasting. Here a mask is placed on areas that are required to remain bright. The work then goes into bonderizing for five minutes at 160-180° F. After a cold water and a hot water rinse the pipes go into a drying oven for five minutes at 120° F and then into a bonderite soak at 160-180° F for rust proofing. The cycle time on this bonderizing is 17 minutes. The pipes are now ready for crating and shipping. THE END.

**Edward H. Newmark**, formerly president of Ace Abrasive Laboratories, Inc., and general manager in charge of production of Star Dust, is no longer associated with this organization. He has joined the A-1 Abrasive Laboratories, Inc., as general manager in charge of production where he will continue the manufacture of laboratory graded pure

diamond powders and lapping compounds.

Trade name for A-1 Abrasive Laboratories' diamond powder is Micro Mesh which is designated by standard numbers from 10 to 15. In production also is an ultra fine size, No. 9 with half the particle size of No. 10. It is claimed finishes achieved with these powders will check to 3 to 5 tenths of a micro inch.



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# How Manufacturers Are Using Broaching to Increase Production and Reduce Costs

More and more manufacturers are turning to broaching as an efficient metal removing method. The war unquestionable helped to boost broaching and many manufacturers, first introduced to it during the war, have stayed with it during peacetime. Primary users of broaching are the automobile manufacturers for whom this machine tool is invaluable in maintaining tight production schedules.

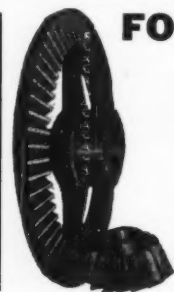
Unfortunately there are still numerous manufacturers some of whose conventional machining operations cry out to be converted to broaching. Too frequent-

ly present methods are considered adequate because that's the way it has been done since the day of the founder; I can think of no more inconsequential reason for adhering to a method than this.

On the following pages are a few broaching applications that have come to my attention. They represent a wide variety of parts for a number of different industries. While your parts may not be identical to those here discussed, there may be enough similarity between them to give you ideas regarding their suitability for broaching.

One machine produces 600 connecting rod caps of two styles per hour at the plant of one of the major automobile producers. Four operations are performed each cycle. The left hand ram produces

two parts (below, on right) for each cutting stroke, the operation being to broach the parting face and sides of the bosses, simultaneously. On the right hand ram two parts (below, left) are produced,



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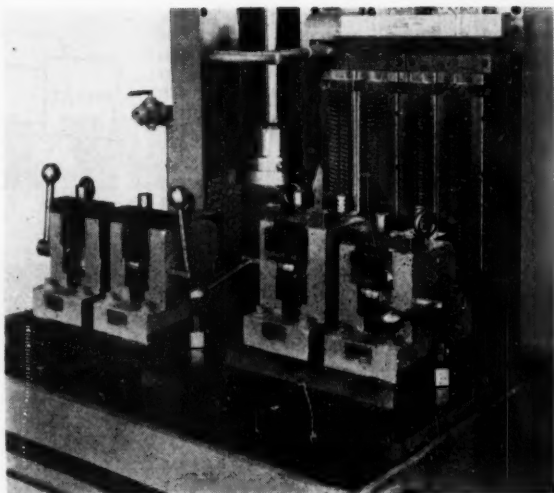
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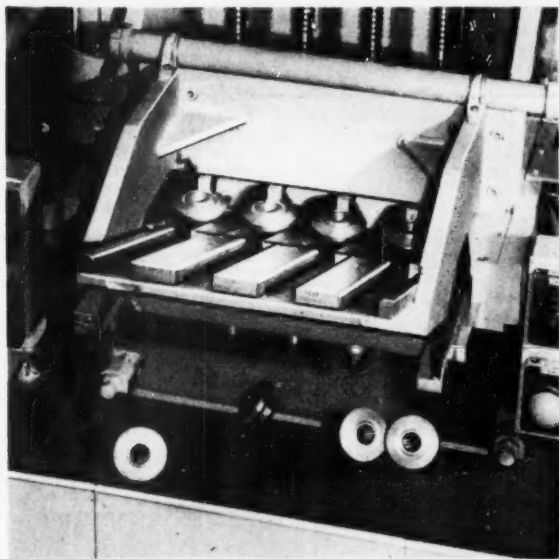
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the operation here being to broach the stepped faces on both sides of the half-round, including a  $1/32^{\circ}$ - $45^{\circ}$  chamfer joining the two steps in both faces. Thus the machine finishes the connecting rod caps as to both parting faces and for side locating. The finish is sufficiently accurate so that these faces can be used as reference points in the final sizing of the half round. Machine is a Colonial 5 ton-42 stroke dual-ram surface broaching machine.



Unusual high production is obtained with this internal pull up broaching machine equipped with special chute feed arrangement for the continuous automatic broaching of bevel side gears.



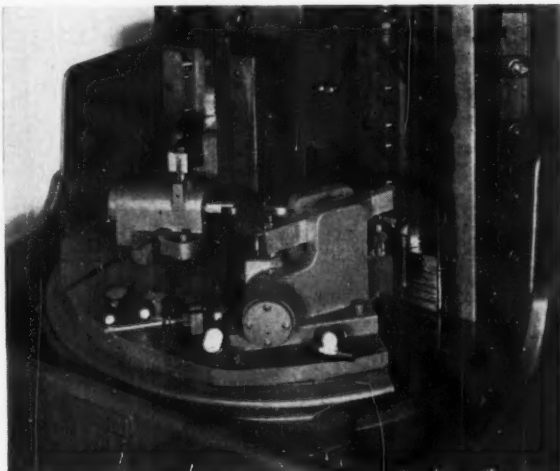
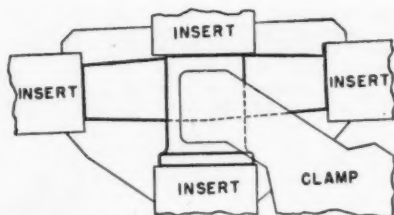
Combination broaches remove about  $1/32^{\circ}$  from the I.D. of an  $1-1/8$  hole, and cut involute splines approximately  $.075^{\circ}$  deep through  $1-9/16^{\circ}$  hub length, all in one pass. Machine is an American VP-4-20-36.

In this instance the operator does not touch the controls after starting the machine but only keeps the chutes filled with gear blanks and removes the broached parts from the front of the machine.

In the machine cycle the parts are transferred, one at each station, by a slide to broaching position. The lower elevator carries the broaches up through parts to connect into American Automatic R type heads. Broaches are pulled through and parts then fall and are deflected to front of machine.

The part is a steel forging and a production of 800 parts per hour is obtained. Four broaching stations are provided.

Conventional broaching of the parts illustrated would probably consist of straddle broaching two large bosses in one fixture and then the two ends in another. However, this would require two set-ups on a single ram machine or two fixtures and a complete cutting cycle on a duplex machine. It was decided to devise broach holder assemblies and fixtures to broach both bosses and two ends in one stroke of the ram, using only one fixture for each two parts. The parts are right-and-left-hand steering knuckle pin supports. One set of parts is broached each cycle of the machine. The material is a steel forging. Production is 274 per hour (137 each of right-and-left-hand parts.) Machine is a Cincinnati No. 10-54 duplex vertical hydro-broach.



Contact faces on ten different sizes and shapes of laminated magnetic iron assemblies for solenoids and relays are finish broached at an estimated production of 400 parts per hour. Up to .014" stock is removed. Deburring operation

is eliminated. Two sets of fixtures (two per set), with associate adapters, accommodate all of the parts. One fixture holds the armature assembly and the other fixture accommodates adapters for four sizes of magnet frame assemblies. Parts

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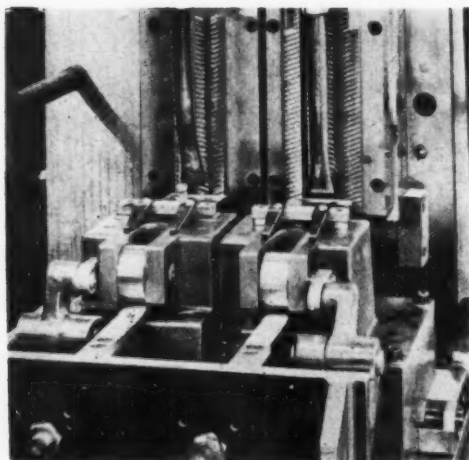
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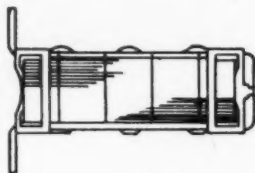
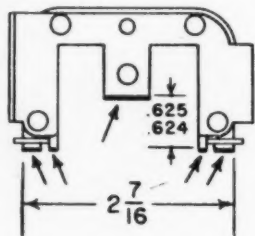
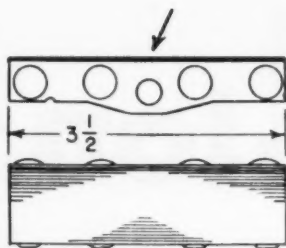
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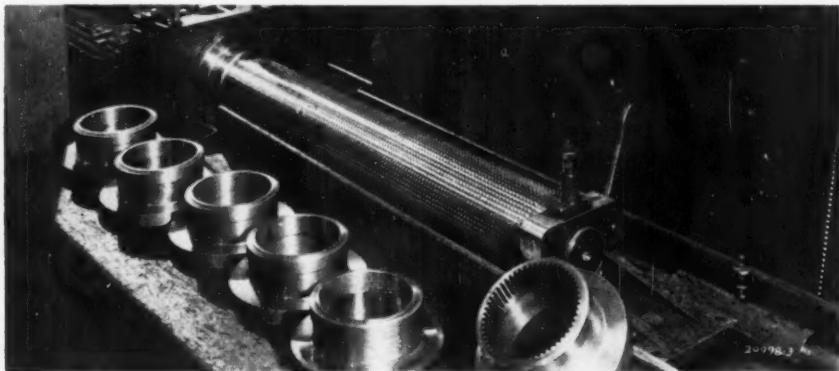
are clamped and unclamped automatically. Jaws retract to facilitate loading and unloading parts. Machine is an Oil-gear.

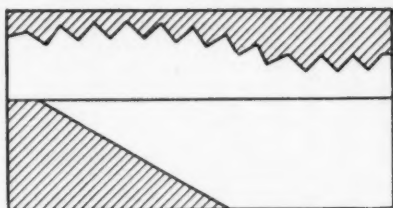
This operation involves the broaching of involute splines in large flexible couplings on a horizontal hydraulic broaching machine. The previous method used to cut the splines was on gear shapers requiring approximately one hour and fifteen minutes for each part. When the part was broached thirty-five parts per hour were broached with no rejections during the entire run of 15,000.

The broach dimensions—overall length 68", O.D. of finishing teeth 7.115, 8/10 pitch, 6.875 P.D., 55 involute splines, and

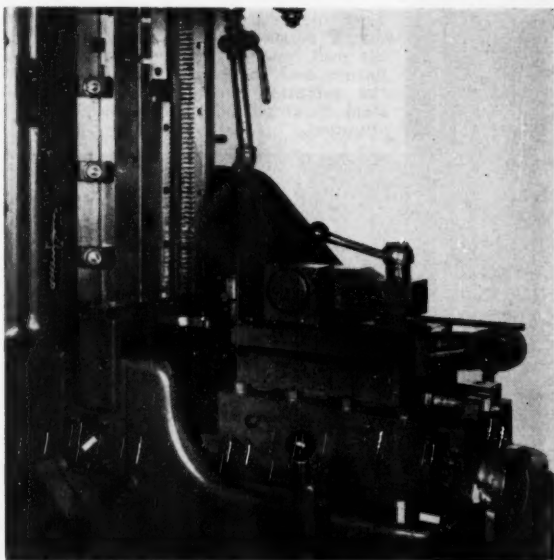


the cutting stroke required to broach the 1-9/16 length of spline was 54". To make the broach a high speed steel forging 8" in diameter, 68" long weighing 900 pounds, was used. Machine was a National.

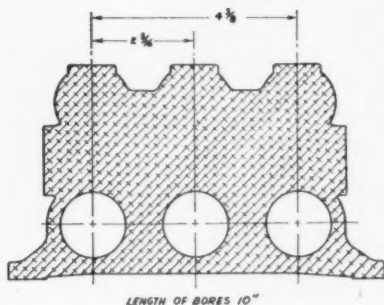




In one broaching operation the serrations and chamfer were broached, the part cut off from the bar stock, and ejected. Part is a jaw insert for pliers. Material is steel bar stock. The operator merely clamps and unclamps the fixture and feeds the bar stock forward. Production is about 200 per hour. Machine is a Cincinnati No. 3-48 Single ram vertical hydro-broach.



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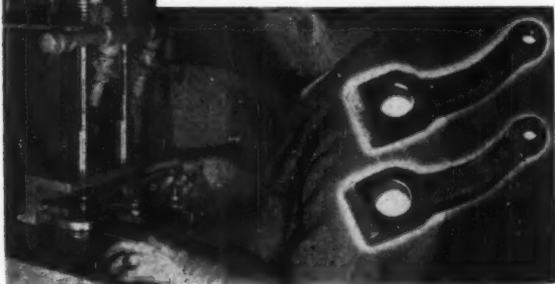
To form these servo units, three round holes, each 1.432"—1.442" in diameter by 10-13/16" long—are broached in magnesium alloy die castings. The broach is 72" long and has 29-1/2" of teeth. These teeth are in groups of 6, followed by a guide dwell. Each sweep of the broach through a casting removes a total of .097" of stock.

Although the wall sections adjacent to the two end holes in the castings are quite thin, broached holes are said to be straight and true with no deformation of the castings. Broach was made by Colonial Broach.

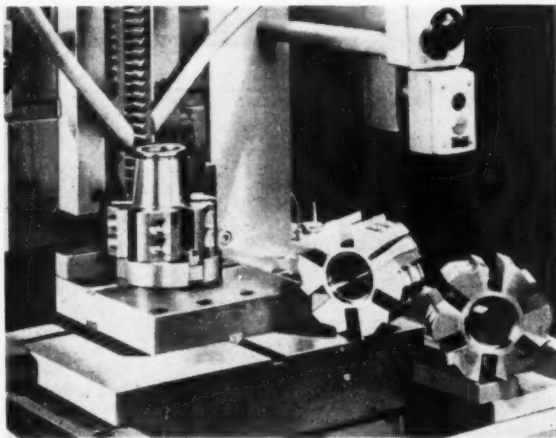


A standard American Type T-10-36 vertical hydraulic broaching machine is shown tooled up to broach the I.D. and 10 serrations in an automotive steering gear arm. The tooling is designed to hold one part at each station with location taken from the tapered hole and approximate radial location taken from the sides of the large boss.

One complete machine cycle consists of operator first loading one part at each station. The retriever unit is moved down by manual control lever and carries the broaches down through the work into the pull heads. The main cylinder broaching stroke is then started by two manually operated control levers. At the end of the pull down broaching stroke the parts are removed from the fixture and the main cylinder reversed. The broaches are carried back up to the retriever which is returned up completing one cycle. As location of the 10 serrations had to be maintained, keys were placed in the pull heads in relation to the location of the parts on the fixture and the broach shanks were ground flat in relation to the serration teeth on the broach. The steering arms are steel forgings and a production of 270 parts per hour is obtained.



Serrations, formerly milled, are now broached in both right- and left-hand generated type alloy steel cutter heads used in form finishing of lumber. Only two sets of tool inserts and fixtures are required to finish heads accommodating 6, 8, 10 or 12 knives. Head is threaded over stub shaft on fixture and a small index locating block is placed in a slot opposite from slot being serrated. Serrations have .0625" pitch and a 90° pitch angle and are .027" deep. Approximately .041" stock is removed. Estimated production: 6 slot heads, 15 per hour; 8 slot





# CHICAGO

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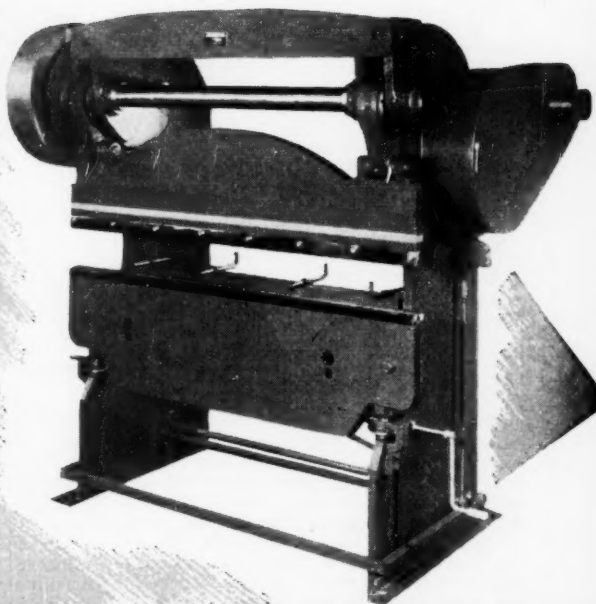
TYPE "300"

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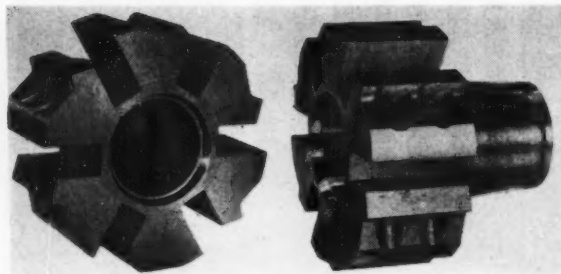
This press will do your work well and efficiently. Dependable service is guaranteed and proven by many years of operation. Variable speed drive for speed and safety.

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**DREIS & KRUMP MANUFACTURING CO.**

7440 LOOMIS BLVD. . . CHICAGO 36, ILLINOIS



heads, 11 per hour; 10 slot heads, 9 per hour; and 12 slot heads, 8 per hour. Machine is an Oilgear.

• • •

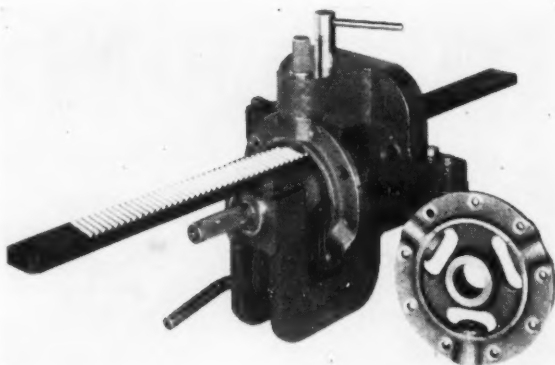
Here is a locating indexing fixture and surface broach used in the broaching of three inside bosses on a differential spider.

Approximately  $\frac{1}{4}$ " of stock is removed from each boss.

This tooling is used on a horizontal hydraulic machine using a stroke of 34". Production, 30 per hour.

The part is placed in the fixture and centralized with plug. The indexing is maintained by centering the vertical plug in radial reamed holes. The broaching thrust is taken on the index plug and part is backed up with in eccentric on the shaft directly behind the index plug.

At the end of the broaching stroke the centralizing plug is partially pulled



out to a reduced diameter. The lever at the bottom side of fixture drops elevating part sufficiently to clear finishing teeth while broach is being returned. Machine is a National.

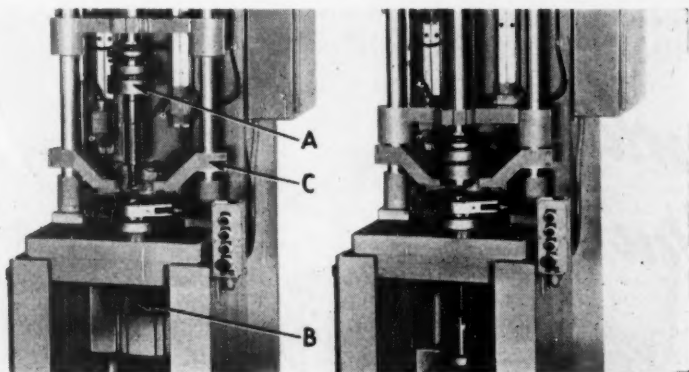
The job of this press is the finishing of case-hardened gear splines. The machine is a standard 6-ton, 36-inch stroke. The broach handling mechanism consists of an automatic release type roller (A) and a lower receiver (B). In the view at the left, the broach is at the top of the stroke, ready to start the cut. As the broach is pushed through the gear, its pilot contacts the broach receiver, forcing it down against a slight hydraulic pressure. At the finish of the stroke

(right hand view), two trip dogs (C) cause the broach puller (A) to release the broach, and the receiver lowers the broach, clear of the work.

After the finished part is unloaded, hydraulic pressure raises the broach receiver and broach and thus automatically reinserts the broach into the puller. The machine now returns to the starting position, ready for broaching the next gear. Note that a swinging fixture is also used here. Fixture operation is

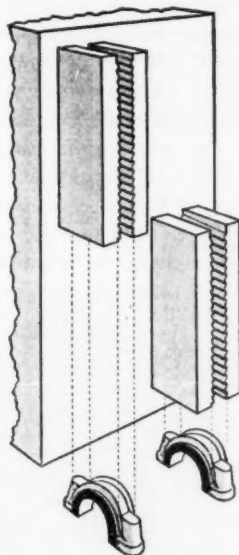
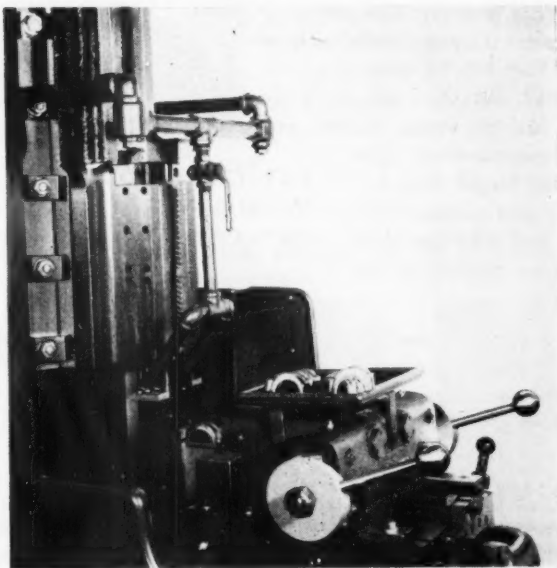
interlocked with the machine cycle. A separate control is provided to permit independent operation of the lower

broach handling mechanism for set-up. Machine is a Colonial Press with automatic broach handling equipment.



Two connecting rod caps are clamped abreast in a manually operated fixture mounted in a single ram vertical broaching machine. To minimize power requirements, the broaching cutters are in two sections, one offset and following the other (see drawing). In one cycle

of the ram two parts are broached, one at a time; over 360 caps per hour. The material is a steel forging. Operation broached crank wheel faces, removing 3/32" stock. Machine is a Cincinnati No. 5-42.






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# Plastic Lubricant Feeds Plug Valves Automatically

Thousands of man-hours have been invested in the search for a method to eliminate the one basic objection to lubricated valves—the need of frequent re-lubrication. Most research men approached this problem by the application of mechanical methods, but George F. Scherer, Director of Research of the Nordstrom Valve Division of Rockwell Mfg. Co. conceived the idea of creating a lubricant that would provide automatic lubrication through the release of compressed energy.

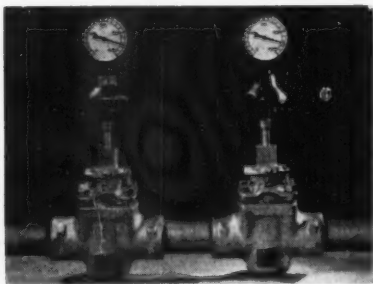
This energizable lubricant, christened Hypermatic, and developed over years of testing, keeps valves fully lubricated over long periods of time. The pressure exerted in injecting the lubricant into the valve powers that lubricant by compression. The stored energy within the pressure containing reservoir is then released as needed to feed the lubricant into any voids that might occur within the pressurized ducts of the valve system. Thus, automatic maintenance with 100% lubrication is achieved without frequent attention.

The development of this plastic lubricant, while a difficult problem, was based upon a relatively simple principle.

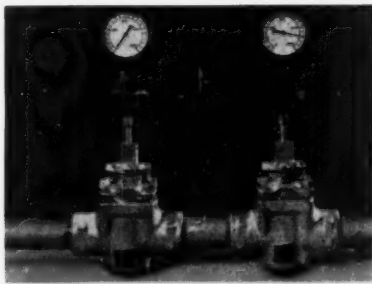
Assume that the valve plug holds 10 cubic inches of lubricant and is filled with 10 sticks of Hypermatic, each one cubic inch. Being compressible, additional Hypermatic can be added, at least to a total of 15 cubic inches in the storage space. Tightening down the lubricant screw energizes the lubricant to any pressure, but for the purposes of illustration, say 350 lb. The pressure remains at 350 lb. until the valve plug is turned many times. As the lubricant is consumed, the pressure will slowly drop, not abruptly as in the case of a non compressible lubricant. This lubricant will continue to feed into any void or source of leakage within the valve as long as there is more than fifty pounds pressure. At that point, the turn of the screw would recompress and thus re-energize the lubricant.

The new plastic lubricant can be used in any valve having a structure which is capable of maintaining the lubricant in a pressurized condition; it is not necessary to clean the old lubricant from the valve. Just inject Hypermatic into the valve in place of the standard, non-compressible lubricant, either by turning down the screw or by use of a grease

Comparative test shows the valve on left pressurized at 350 p.s.i. with standard lubricant on a test line. Valve on right is pressurized to 350 p.s.i. with energized lubricant.



Same valves six months later shows valve pressure of standard lubricant has dropped to 0 p.s.i. Pressure on energized lubricant shows negligible decline.



• • •

George F. Scherer of Nordstrom laboratory demonstrates comparative action of standard and energized lubricants in pressure line. After groove in each port is scraped to simulate a leak, the valve with the conventional lubricant (at left) leaks as is indicated by bubbles. Valve with energized lubricant quickly seals and stops leak.

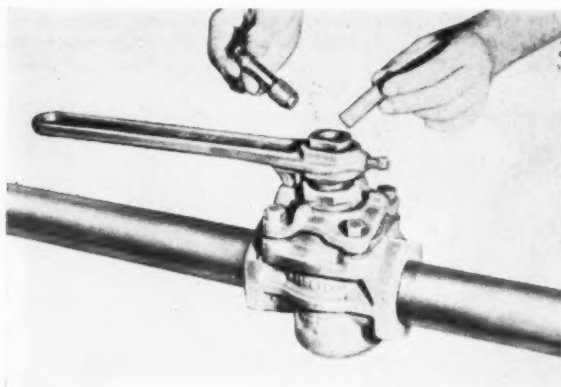
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gun. The lubricant will function with pressures as low as 50 lb. or as high as 1000 lb. It is effective in temperatures ranging from sub-zero to 250°F. Tests on higher temperatures are currently in progress.

To fill the needs in various industries,

eight types of Hypermatic lubricant are available. Each has different characteristics, or properties, designed to resist different temperatures, fluids, and working conditions. Any of these types is available in stick or soft bulk for manual or grease gun application.



• • •

Inserting stick of plastic lubricant in valve. Screw is then inserted which energizes the automatic lubricant by compression.

• • •



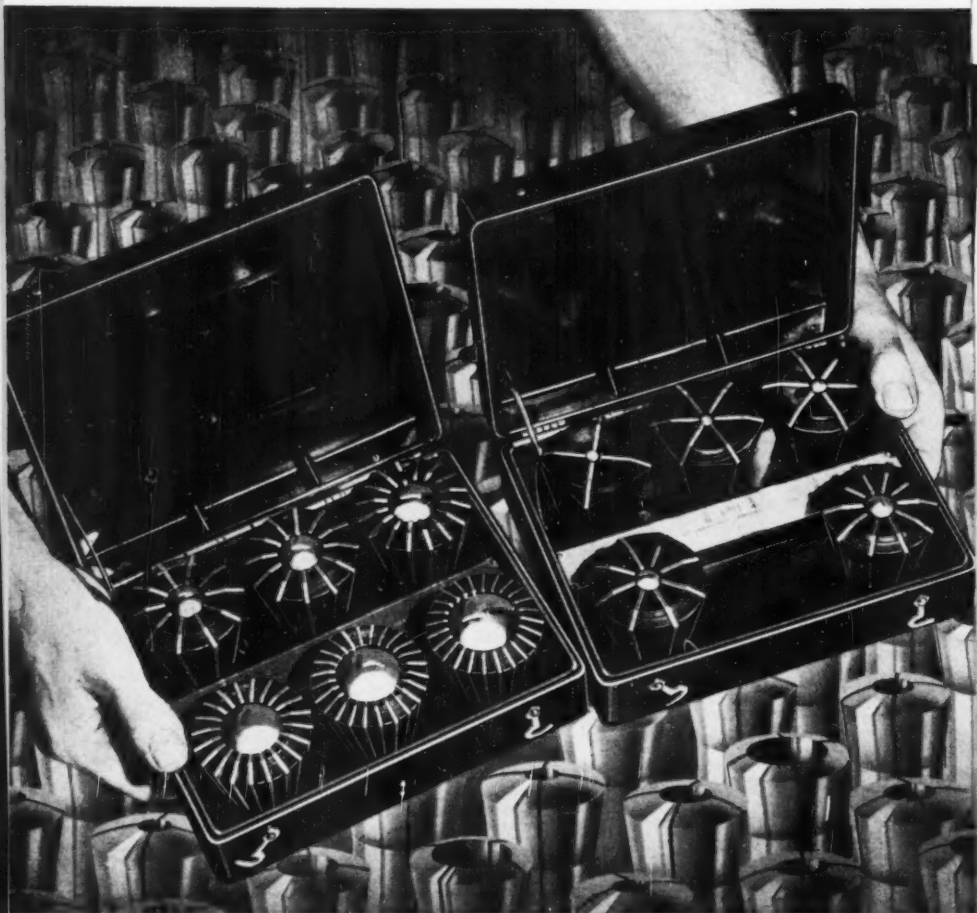


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**ROTO-CLONE** is an exclusive product of American Air Filter Company, Inc., Louisville, Kentucky, representing a complete line of dust collector designs widely used in every dust-producing industry.





**SO FEW DO SO MUCH!** The full set of eleven Jacobs Rubber-Flex Collets fits into two moisture-proof plastic boxes, each

only 6 x 9 x 3"! They chuck any bar from  $\frac{1}{8}$ " to  $1\frac{1}{2}$ ". You'd need 88 steel collets to cover the same range in 64ths.

## THESE 11 COLLETS DO THE WORK OF 88

**Revolutionary new collet design brings you unique performance**

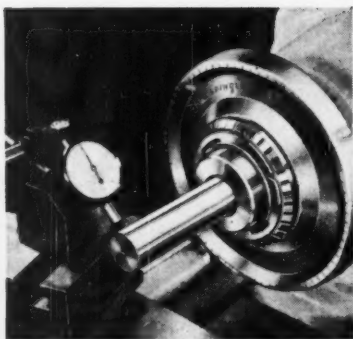
Each of these remarkable Jacobs Collets has a capacity of  $\frac{1}{8}$ "... with accuracy and gripping power constant throughout! No more need to stock up on collets by  $\frac{1}{16}$ ",  $\frac{1}{32}$ ",  $\frac{1}{64}$ ", and special decimal and metric sizes. No more costly storing, maintenance.

The hardened and ground steel jaws of the collets are bonded and mechanically locked together with Hycar Synthetic Rubber which will not set

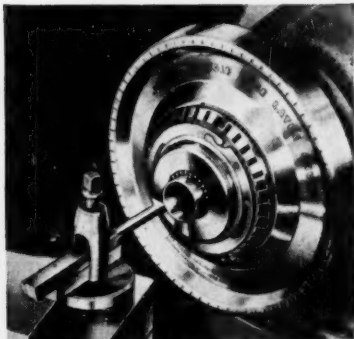
and which is not affected by heat, coolants, and cutting compounds. The jaws, being always parallel to the work, develop a gripping power of two to four times that of steel collets.

This chuck not only gives excellent performance when machining heavy cuts, but is equally outstanding when gripping thin shelled and fragile work.

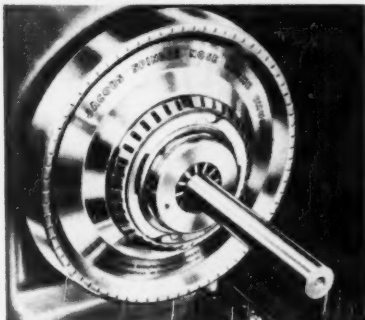
Write for bulletin 49-LC describing this new Lathe Collet Chuck.



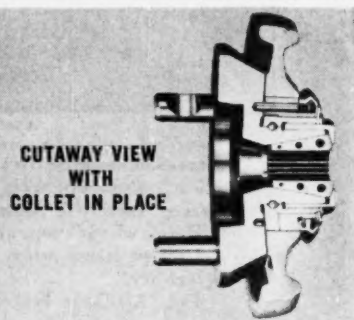
**UNPARALLELED ACCURACY** — The most accurate Lathe Collet Chuck in the world today. The body is made from a single steel forging and is hardened and ground throughout. All internal and external surfaces of the collets are precision ground.



**TWO TO FOUR TIMES THE GRIPPING POWER** of split steel collets — by actual test — is yours with Jacobs Rubber-Flex Collets. Will not mar outer surface of the work as the gripping pressure is uniform over the entire length of bearing surface.

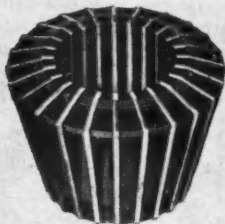


**RUGGED CONSTRUCTION** — With the exception of the solid aluminum Handwheel, all parts of the chuck are of hardened and ground alloy tool steel. Its compact design allows a saving of 1½"



**CUTAWAY VIEW  
WITH  
COLLET IN PLACE**

of overhang compared to present collet equipment. A unique impact tightening mechanism allows for very easy opening and closing of this chuck, thus reducing operator fatigue.



#### THE JACOBS RUBBER-FLEX COLLET

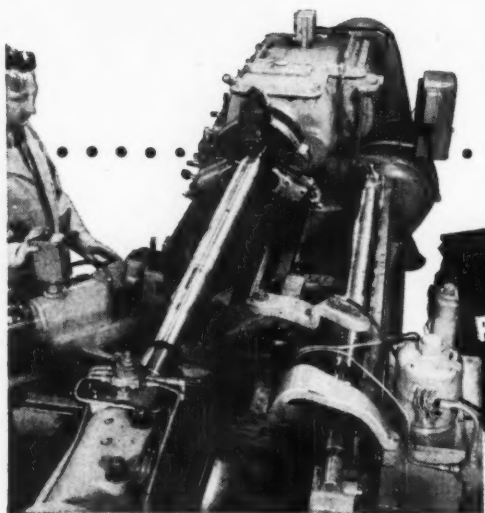
1. All external and internal surfaces precision ground.
2. The jaws in all collets have extremely long bearing surfaces in relation to the diameter.
3. Collet jaw bearing surfaces always parallel to and in full contact with work, assuring accuracy and gripping power.



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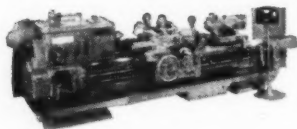
mended particularly for extra long work.

- 4—Equally proficient for contour turning, boring and facing—and for multiple diameter work, including step shafts.

- 5—Available in conjunction with variable feed and rapid traverse return as a Packaged Unit, which provides a completely automatic cycle as a further boost to production.

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**FOR A GOOD TURN FASTER — TURN TO MONARCH**

## GUARDING PROBLEMS AS

# *Injury Cause*

by L. A. Faulkner, Liberty Mutual Insurance Co.

Why are many punch press accidents caused by inadequate guarding? The author claims the reasons are: 1. Lack of understanding of guarding problems; 2. Lack of "know-how"; 3. Improper appreciation of the problem. Accidents can be reduced if proper punch press guarding programs are instigated by management and are enforced.

**T**O WHAT extent is improper guarding of punch presses a cause of accidents?

Out of a total of 273 cases, 151 occurred where there was no guard in use or the guard was ineffective. I believe that some cases listed under press deficiencies belong in this same grouping. There are three under sub-heading of Broken Barrier Guard: 1 worn cage guard; 1 sharp edge gate guard; and 1 case resulting from a loose collar on a swing guard. This gives us a total of 157 accidents out of 273 or 57% occurring on either unguarded or ineffectively guarded operations.

To me this indicates (1) a lack of understanding of what constitutes adequate guarding, (2) the lack of the "know-how" of punch press guarding, and (3) an improper evaluation of the extent of the punch press problem and the development of a well-balanced program. On this basis, let's discuss these items one at a time.

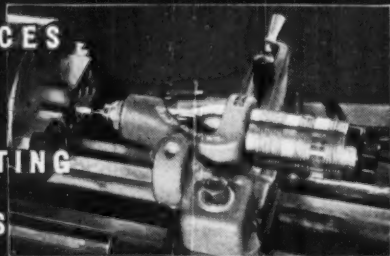
1. What constitutes adequate punch press guarding? An adherence to the new American Standard Safety Code B-11.1 for Power Presses and Foot and Hand Presses, or some state or federal codes should constitute adequate guarding. However, I'll go one step further and cite a few simple standards that have been the secret to the success of the punch press program in some plants.

a. All primary operations shall be provided with individual die guards or adjustable press barriers.

b. All secondary operations must be provided with automatic or semi-automatic feeds to eliminate "under

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## PRECISE SUPER 40



the punch" manual feeding. Such dies must be provided with individual die guards or press barriers used.

c. Under conditions whereby feeds and die guards or press barriers cannot be used, hand tools and some specific type press guard must be provided. By press guard, I refer to some type of pullback, sweep, two-hand control, etc.

2. The second item that this analysis shows is an apparent lack of "know-how" as to punch press guarding.

What is this thing called "konw-how" of punch press guarding? To my way of thinking, the "know-how" of punch

press guarding consists of an attitude of mind plus the application of a few simple mechanical engineering principles. If management honestly wants to operate a press-room minus accidents and production interruptions, it must take a definite stand on the subject, be willing to spend the money; and the "know-how" is usually available within its own organization if properly guided.

This "know-how" is available in the reference material and consulting service of the Power Press Section of the N.S.C., U. S. Department of Labor, American Standards Association and insurance company safety engineers.

3. The third item that this analysis reveals to me is a lack of a proper evaluation of the problem in individual plants. Note the large number of accident causes under the heading of Guarding and the large number

of accidents listed under Press Deficiencies.

I wonder how many people actually evaluate their punch press problem with the idea in mind of actually getting to the base of the problem? I know from experience that all too many plants never properly analyze their press room safety problems. Many plants guard secondary dies but do nothing in regard to primary operation dies, others provide a few universal type press guards that have been bought as a result of some one serious accident but cannot be used on many operations because of the type of



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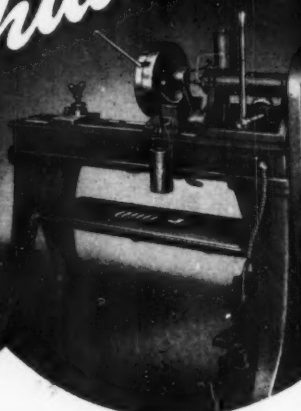


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die design, still others do a fair job at punch press guarding but actually let the presses deteriorate for want of a maintenance program.

In order to establish a well-balanced program, certain basic principles must be considered.

One must consider the safeguarding problem in a small press room with a foreman die setter and a few operators involved in such that a simple program can be developed. This program will consist of the guarding of a few dies and provision of press guarding facilities supplemented by the personal super-

vision of the foremen die setter over safe practices.

Where twenty or more presses are involved, the press room may be divided into separate departments under various supervisors. The die setting operation may be sub-divided among various individuals with the result that split responsibility exists. Therefore, a workable program would consist of the development of company standards that must be adhered to by all who enter into the problem. This would include the supervisors and employees of the plant planning, die design, maintenance and electrical departments. These standards should consist of a statement of company policy as to the use of existing guards, provision of protection for unguarded operations, the consideration of the safety factor in new operations, enforcement of safe operating specifications, etc.

The type and make of presses must be considered. Small positive clutch machines present a problem in the guarding, the die or providing a press guard. The larger draw presses or friction drive machines are much different in design and the more common type guards are the constant pressure two-hand trips, pullback guards, etc.

The number of dies involved is a major factor in determining the extent of the point of operation guarding program. The number of active dies and the number of dies in dead storage



## TROUBLE REPORT

Machine Time	15 min.	OK
Set-Up Time	65 min.	NG
Remarks	Spent 15 minutes hunting for arbor spacers! Same on every job!	
Recommendation	Order 2 Sets of De-Sta-Co arbor spacers for each milling machine! JB	

### That's Right!

When machinists waste time hunting for arbor spacers it costs you plenty! A money-saving solution is to provide an extra set of De-Sta-Co arbor spacers and shims for every milling machine in your shop. Demanded by name for over 30 years, they're the machinists' preference for spacing of cutters, saws and slitters, for shimming gears and bearings and for all machining set-ups. Two sets per machine will save set-up time on your jobs.



**ARBOR SPACERS**  
Keywayed



**SHIMS**  
Not Keywayed

De-Sta-Co arbor spacers come packed in standard sizes from  $\frac{3}{8}$ " to 4" I.D., thicknesses from .001" to .125", all with keyway. Handy cellophane envelope contains set of 19 graduated decimal thicknesses. Shims supplied in same sizes without keyway. Specials, thicknesses over .125", available in popular sizes, machined from bar stock, hardened and ground, with standard keyways. Order De-Sta-Co arbor spacers and shims from your mill supply house.

## DETROIT STAMPING COMPANY

347 Midland Avenue

Detroit 3, Michigan

should be inventoried.

If this inventory shows a large number of active dies and a dead storage supply of many more dies, consideration should be given the provision of die guards and feeds on these dies used for high production operations, as the first step toward safeguarding the dies most often in use. Adjustable press barriers should be used for short run operations or where it is impractical to guard these dies. Press guards should be installed for use on operations in which feed are not provided, and barriers cannot be used.

a roll or hitch feed may be used.

The operator is not required to place his hands in the danger zones, so a die guard or press barrier will not interfere with his movements.

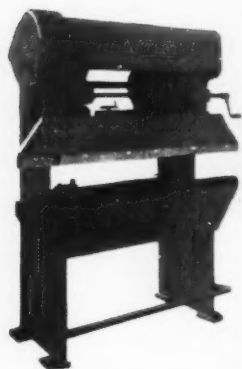
The provision of an individual die guard on each die in this category would be ideal. However, it is generally a long-range proposition and pending the completion of such a program, it would be advisable to provide the dies used for heavy production operations with die guards and provide adjustable press barriers for those dies used infrequently or for short runs.

Should this inventory reveal the fact that a job-shop condition exists in which the runs are short and many die changes are made, or the dies are the property of other manufacturers, it is advisable to consider the installation of press guards on each machine for use on a secondary operation. An adjustable press barrier should also be installed on each press for use on blanking shearing, corner-cutting, etc.

An analysis of the operations necessary to determine the extent of the variance in type of point of operation hazards. This analysis should enable you to group operations according to primary, secondary or miscellaneous operations.

The primary operations include blanking, piercing, parting, corner-cutting, progressive dies, simple compound dies, etc. Such operations are usually manually fed to the press, but at times,

# BIG PRESS BRAKE DESIGN SMALL BRAKE COST



Shops that are wasting manpower with hand brakes or tying up big machines with small odd jobs have the answer to their problems in the new Verson 16-48 Press Brake. Compact and low in cost, the 16-48 brings the advantages of power operation and big brake design to smaller shops. Bed and ram length is 48". Capacity ranges from a 48" length of 16 ga. steel to a 24" length of 10 ga. steel. Allsteel construction assures perfect alignment and maximum rigidity. Write for a copy of Bulletin 16-48A; it gives complete design details, specifications and capacities.

## VERSON ALLSTEEL PRESS CO.

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The secondary operations includes bending, forming, embossing, coining and pressing or other operations whereby a blanked unit is further processed. All dies where it is necessary for the operator to place his hands in the danger zone to nest a piece in the die manually should be included in this category.

When many parts are processed on one die, it is usually economically practicable to provide a feeding device which eliminates the necessity for the operator to place his hands in between the dies. After a feeding device has been provided, a barrier guard should be installed

to prevent the operator from reaching around the feeding device. A feeding device does not constitute full protection. It eliminates the necessity for the operator to place his hands between the dies and allows the installation of a barrier guard.

You will find miscellaneous operations which include riveting, assembling, burnishing or sizing dies, straightening or flattening dies, marking and numbering dies, crimping dies, etc. Due to the lack of other equipment, these operations are performed on a punch press.

These are specialized operations and normally found being operated on small run production for special jobs. Operations of this type are usually in the secondary operations class and can best be guarded by the use of the various types of two-hand controls, gate guards, pull-back guards, etc.

There are occasions, however, where some changes in die design provides a safe operation by the use of simple feeding applications. An example of this is the use of a slide for a riveting operation. The parts to be riveted are placed on the slide and the slide is then pushed to a position under the punch.

One must consider the production rates. Special consideration should be given to all dies used for long run production. Dies of this type are usually such that various types of feeding applications will prove practical. In such instances, the jobs can carry the expense

of guarding and tailor-made guards can be provided. The guard should consist of a barrier permanently attached to the die or die shoe and remain a part of the die at all times. At times it is necessary to provide a feeding application in order to be able to use a die guard should the die be in the secondary operation category. These feeding applications often speed up the operations to the extent that they are well worth the time and money spent.

Dies that are used for short run production or dies that may be the property of other manufacturers often cannot be provided with die guards. Feeding applications are often economically impractical and changes in the design of the die are not possible.

Punch Press Operations of this type are the most difficult to guard effectively. The safeguarding of the operators under these conditions should be considered as an overhead expense and guards provided as permanent press fixtures that can be used on the majority of jobs found to be in operation.

In this respect, an adjustable press barrier should be provided on each press

for primary operations. A gate guard, two-hand trip, pull-back, sweep guard, etc., should be available on each press for secondary operations.

I purposely refrain from any comment in regard to punch press inspection. However, I do want to leave one thought with you that has a bearing on the large number of accidents that show up in this analysis as a result of maintenance problems. By keeping in mind the basic principles of punch press guarding which is to eliminate as much as possible "under-the-punch" feeding through the use of automatic or semi-automatic feeding devices and the installation of the most effective type of punch press guard which is a barrier enclosure, accidents resulting from an accidental tripping of the press can be minimized. In other words, if your guarding program considers the fact that accidental tripping of the press is a possibility and you guard against it by providing the facilities for the operator to feed the press without his hand being in the danger zone, actual accidents caused by mechanical failure will be eliminated. THE END.





**HIGHER PRODUCTION?**

*Yes!*

**LOWER COSTS?**

*Yes!*—and

**ACCURACY BESIDES**

with the

**MOTCH & MERRYWEATHER**

**NO. CIRCULAR  
2-A SAWING  
MACHINE**



**Triple-Chip METHOD**

Triple-Chip Method cut off 490 pieces in 50 seconds per cut at a cost of \$.0101 per piece.

**1¢**  
PER CUT

**TRIPLE-CHIP**  
VS.  
**ALTERNATE METHOD**

(Sawing SAE 1020 5" O. D.)



**3 1/4¢**  
PER CUT

Alternate method cut off 100 pieces in 235 seconds per cut at a cost of \$.0325 per piece.

As with all Motch & Merryweather Circular Sawing Machines, the No. 2-A (automatic) brings you all the advantages of the Triple-Chip Method. Stock up to 6" is sawed accurately to length without burrs, giving a mill-type finish, which eliminates second operations. Work is held rigidly on both sides of the blade. With the M. & M. Triple-Chip Saw Blade, correctly sharpened by the No. 1 Automatic Grinder, maximum cut-off speed and accuracy are attained. Ask us to furnish you with cutting time figures.

★ ★ ★

The M. & M. No. 2-A Circular Sawing Machine has automatic, micrometer adjustable-stop bar feed to 36". Additional stroke lengths and conveyor can be furnished to accommodate long length bars.

• • •

A complete range of circular sawing machines is available for stock up to 16 1/4" round as well as special machines to meet your requirements.

Write on your letterhead for Bulletin No. 2-B.

**THE MOTCH & MERRYWEATHER MACHINERY CO.**  
PENTON BUILDING

CLEVELAND 13, OHIO

AT YOUR COMMAND • AN UNPARALLELED EXPERIENCE IN CIRCULAR SAWING

# Letter from England



Written for the MACHINE and TOOL BLUE BOOK by Robert Hutcheson, Editor of MACHINE SHOP MAGAZINE, London, England.



**Devaluation of the pound.** The two most recent happenings of paramount importance in the country are the devaluation of the pound with its worldwide repercussions and the cuts that are to be made to reduce national spending. Both steps are viewed here with mixed feelings and leading financial experts and industrialists do not regard devaluation with any marked favour. As regards the cuts, there is quite a widely expressed opinion that they do not go far enough, whilst the cutting down still further of capital expenditure is not conducive to an increase in production. However, time will tell what the joint effects of devaluation and cuts will be and already some cabinet ministers are forecasting further cuts.

**The cycle industry.** There is one bright and fertile oasis in the form of our cycle industry. The annual exhibition of bicycles and motor cycles is running in London and exhibitors are reporting very substantial and firm orders for bicycles. However, the Cycle and Motor Cycle Manufacturers' and Traders' Union are complaining that the Board of Trade has not done all that is possible to protect the interests of the manufacturers. They complain that they cannot export to certain of the Scandinavian countries, while Czechoslovakia is able to export motor cycles in large numbers to Holland. The cycle and motor cycles industries, depending as they do, so largely upon the steel industry, are by no means

happy about nationalisation of the steel industry and express grave doubts as to whether further Government control will be of any advantage. During the past nine months, motor cycles to the value of four and a half million pounds (\$12,500,000) have been exported while the cycle makers have sent abroad about one and three quarter million machines having a value of nearly twelve million pounds (\$33,500,000).

**Patent infringement.** The meeting here between Mr. Henry Ford of the Ford Motor Company and Mr. Henry Ferguson of Ferguson Tractors here in London, created interest in view of the very high sums of money involved as damages for alleged infringement of patents, and many industrialists with whom we have talked expressed disappointment that the settlement could not be arrived at. It is not often that patent proceedings receive a great deal of publicity in our national newspapers, but this one did catch public fancy by reason of its two principals and the vast sums of money involved.

**Men needed for atomic research.** What with atomic explosions in Russia and our Government's drive to obtain scientists for atomic research, the atom has again come into the news. The Government wants scientists who will make atomic research their life work and who will explore undeveloped fields of atomic energy research. It is felt that much of

## Severance DEBURRING CUTTERS HIGH SPEED CARBIDE



Unexcelled for power and hand deburring  
Sectional pattern teeth give shearing action

### Severance INSIDE DEBURRING CUTTERS

Select 45° High Speed cutters from 28 standard sizes and 30° cutters from 35 sizes—from 1/4" to 3" diameters.  
Both angles can be supplied in CARBIDE

### Severance OUTSIDE DEBURRING CUTTERS



For speedy light deburring of rod ends and tubing O.D's., either off-hand or in screw machines. Select 30° cutters from 14 standard sizes and 45° cutters from 10 sizes—up to 4 inch diameter.

ANGLES 30° & 45° C/L

Both angles can be supplied in CARBIDE

### OUTSIDE CHAMFERING MILLS

Operate in machines to perform heavy chamfering without chatter—in above size range and angles.



HEADQUARTERS FOR DEBURRING AND  
CHAMFERING TOOLS DEVOID OF CHATTER

### Severance HAND DEBURRING CUTTERS



"A Twist of the wrist" easily bites off the bur left by drill or punch.

Ten standard sizes for 1/4 to 2" diameters.

Write for Bulletin 16-D

Complete REGRINDING Service — by New Tool Craftsmen  
— Savings are thus multiplied —

## SEVERANCE TOOL INDUSTRIES, Inc.

722 Iowa Ave.,

Saginaw, Michigan

### MIDGET MILL GROUP

STANDARD



a miniature atomic pile and produces radio-active isotopes for medical use. The use of this plant will eliminate the need for transport of these isotopes, some of which have an effective life of only eight hours. Among the uses of these radio-active isotopes is the diagnosis of cancer and the Company claim that the use of this equipment in parts of the British Empire out of reach of the Government research stations would be a great advance in medical science.

**The forty-four hour week.** In general the engineering industry of this country works a forty-four hour week, any extra time at work being paid for at increased overtime rates. These hours are put in to a five day week, which leaves the worker completely free on Saturday and Sunday. The reduced hours and the five day week were obtained after many years by the engineering unions

but today the suggestion is being made from many quarters that the five and a half day week should come back. One of the greatest advocates for suspension of the five day week is Mr. Jack Jones, who is Parliamentary Secretary to the Ministry of Supply, and a former steel works employee before he became a Member of Parliament. Mr. Jones has been touring industrial centers of Britain, making a call to workers to work the longer week, as he contends that it is the only way to increase production with our present labour force and manufacturing facilities. Naturally enough, after having

the research work done in industry can be done by well established methods, but the pace at which research must be done on atomic energy calls for complete changes in technique and in equipment.

Portable atomic plant. Not all the work done on atomic research is for destruction and it is pleasing to note that one British firm, A.S.P. Chemical Company, have developed a portable atomic plant which they call the "Aspatron" for use in hospitals, universities and other medical research establishments. The apparatus, which is the first of its kind, is

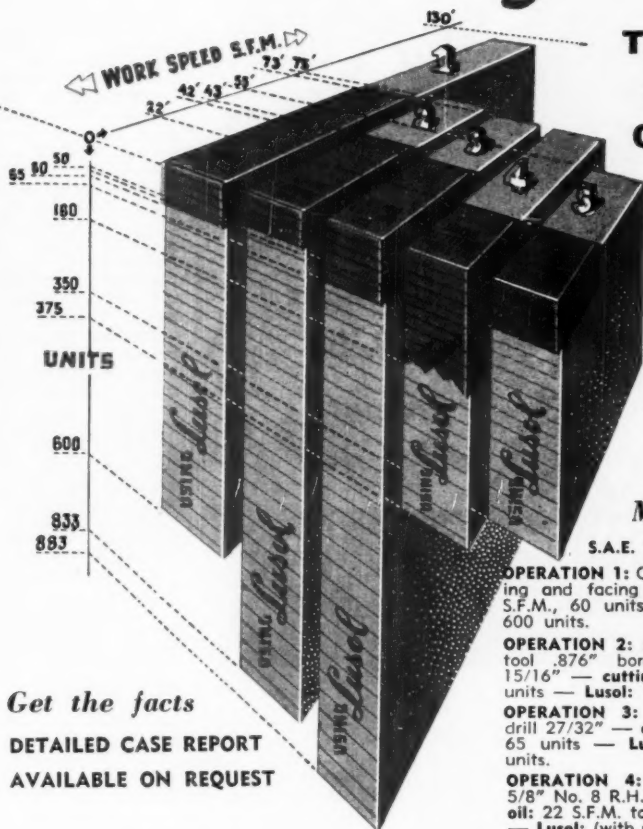


# BONNET [ FOR 1 INCH 600 lb. VALVE ] PRODUCTION

INCREASED WITH

*Lusol*

THE TOOL  
SAVING  
COOLANT



*Get the facts*

DETAILED CASE REPORT  
AVAILABLE ON REQUEST

**F. E. ANDERSON OIL COMPANY**  
PORTLAND, CONNECTICUT

RUST PREVENTATIVES • SPECIAL INDUSTRIAL FLUIDS • CLEANERS

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LOUISVILLE, PHILADELPHIA, DALLAS, HOUSTON, LOS ANGELES, TULSA, INDIANAPOLIS

## Material used

S.A.E. 1035 FORGED STEEL

**OPERATION 1:** Carbide tool bit, turning and facing — **cutting oil:** 73 S.F.M., 60 units. **Lusol:** 128 S.F.M., 600 units.

**OPERATION 2:** 6 flute H.S.S. boring tool .876" bore, chamfer top to 15/16" — **cutting oil:** 43 S.F.M., 50 units — **Lusol:** 75 S.F.M., 833 units.

**OPERATION 3:** H.S.S. taper shank drill 27/32" — **cutting oil:** 42 S.F.M., 65 units — **Lusol:** 73 S.F.M., 883 units.

**OPERATION 4:** Tandem type lead 5/8" No. 8 R.H. Acme tap — **cutting oil:** 22 S.F.M. tap broke at 160 units — **Lusol:** (with single lead) 73 S.F.M., 375 units.

**OPERATION 5:** Die chasers for 1-31/64 No. 12 N.S.T. — **cutting oil:** 22 S.F.M., 55 units — **Lusol:** 55 S.F.M., 350 units.

FEEDS SAME FOR BOTH FLUIDS



**SECOMET  
DIAMOND  
WHEELS**

**Cut  
faster  
and cooler  
with longer  
wheel life.  
Prompt  
deliveries**

**J. K. SMIT & SONS, INC.**  
Gen'l Offices & Plant: MURRAY HILL, N. J.  
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157 Chambers St., New York 7 6400 Tireman Ave., Detroit 4  
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fought for the shorter working week, people are reluctant to forgo it and there is a serious question to be settled as to whether longer hours are to be worked for the present weekly wage or whether wages should be increased and perhaps even overtime rates paid for any time work over the forty four hour week. The payment of overtime rates is often uneconomical from the financial point of view and is resorted to only as an expedient for dealing with urgent work and it would certainly seem that the payment of high overtime rates would help

tion in building of houses and schools, there will be a limit to the amount of displaced labour that can be absorbed into the building industry. The Tyne-side shipyard workers at present do a five day week of forty four hours during the summer but are to work a five and a half day week of the same duration during the winter. In this way they can make greater use of daylight during the winter months. However, in view of the dwindling away of work, an attempt is being made to retain the five day week all the year around.

to offset the benefit obtained from extra production.

**Shipbuilding.** Our North country shipbuilding repairing yards have been busy since the war with the building of new ships and the repair and converting of others. Unfortunately, much of this work is drawing to an end and Tyne-side ship yards have been paying off their men. As work is completed, new work is not flowing in at a sufficient pace to replace it fully and ship builders attribute this at least partially, to increased costs over those of foreign yards; a large proportion of the increased cost is made up, it is alleged, by extra wages. Certain of the men paid off, for example, carpenters, joiners and electricians, will be able to find work on some of the large housing schemes that are being conducted by local authorities, but in view of the fact that among the cuts announced recently by Mr. Attlee, is a reduc-

**Jet engines.** The two original jet engines which were installed in the world's first successful, jet-propelled aircraft, have been handed over to Mr. G. R. Strauss, Minister of Supply, who received them on behalf of the nation. One of these is to remain permanently in the trust of the Science Museum here in London, whilst the other engine is to be presented to the Smithsonian Institute in Washington. The engine, which is going to your country, was sent to the United States in October 1941 for study under hush-hush conditions and was later returned to this country. This second engine was formally accepted by Mr. Don C. Bliss, Consellor for Economic Affairs at the United States Embassy here in London who has accepted it on behalf of the United States.

Victor Equipment Company announces the purchase of the business and assets of the Los Angeles firm of Mills Alloys, Inc., 11320 S. Alameda St., Los Angeles, Calif. The purchase includes the purchase of the physical assets of Mills Alloys such as inventory, machines and equipment, the company's trade name, all patents, trademarks and formulas. The manufacturing facilities purchased by

Victor will continue to be located at the leased site now occupied by Mills Alloys, and will be designated as the Alloy Rod and Metal Division of Victor Equipment Company.

Mills Alloys has been in business for more than 25 years and is a manufacturer of all types of blasting nozzles and all types of tungsten carbide hard-surfacing rod. These products of Mills, which in the future will be manufactured by Victor, will complement the present Victor manufactured line of gas welding and cutting equipment and allied equipment.

## ATLANTIC GEARS

precision-cut and inspected, on new, latest equipment. All sizes and types. Send samples or blueprints for quotation.

**ATLANTIC GEAR  
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★ THE BENDER PEOPLE  
OVER 50 YEARS

# Wallace

Here is an easily operated hand bender for economical bending of flats, rounds, pipes and bars. 4" high dies and 2" diameter pin for radius bending included as standard equipment. All steel construction, sealed ball bearings, die holders keyed for speedy change-over are other features of the Wallace No. 9 Hand Bender... a basic unit for production and for maintenance. Write, phone or wire today for detailed bulletin.

"Cold Bending Manual" and data on HYDRAULIC POWER benders available on application.

NO 9  
HAND BENDER



**WALLACE SUPPLIES MFG.**

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**WHERE LIGHT  
IS RIGHT**

*Costs are Lower • • • •*

**LOCALITE**

**THE VITAL  
SEEING ZONE**



**BALANCED  
LIGHTING**  
**fostoria**

**GENERALITES • LOCALITES**  
for Overall Lighting • for Light ON the Job

Trade Mark  
Reg. U. S. Pat. Off.

# Increase . . .

## PLANT OPERATING EFFICIENCY

● ● That's what you get when you  
*Localite* your precision jobs!

Fostoria Localites are especially designed to direct the *right amount* of light exactly where it's needed — on the immediate working area. And they're instantly adjustable by the worker himself to suit the seeing requirements of his particular job. You'll see a big difference in plant operation after you install Localites. Worker accuracy and efficiency increase . . . rate and quality of production go up . . . costs come down. Like thousands of other industrial users, you'll be enthusiastic over the time and money-saving value of Localites. There's a Localite designed for every seeing need. Check your plant's requirements today!

Write for free folder on "How to Plan Your Lighting" and complete catalog of Localite models.

**THE FOSTORIA  
PRESSED STEEL CORP.**

FOSTORIA, OHIO, U.S.A.

**FOSTORIA LIGHTING EQUIPMENT IS AVAILABLE THROUGH  
SELECTED WHOLESALEERS FROM COAST TO COAST**



**MODEL 3267-C-174**

Used extensively for illuminating large work areas for machine tools, assembly, inspection and instrument repair. Overall length 32 3/4". Three joint adjustable. Flat oblong base for machine screw mounting.

*In excess of 200 footcandles.*

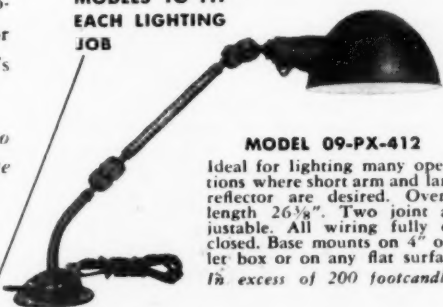


**MODEL 3267-HP-174**

Very popular for all types of machines. Often used in pairs for lighting work area from two sides. Three joint adjustable. Overall length 31 3/4". Flat oblong base for machine screw mounting.

*In excess of 175 footcandles.*

**ALSO 27 OTHER  
MODELS TO FIT  
EACH LIGHTING  
JOB**



**MODEL 09-PX-412**

Ideal for lighting many operations where short arm and large reflector are desired. Overall length 26 3/8". Two joint adjustable. All wiring fully enclosed. Base mounts on 4" outer box or on any flat surface.

*In excess of 200 footcandles.*

# Efficient Gear Inspection in a Gear Job Shop Cuts Rejects, Increases Quality

"We won't release any job to a customer unless we are satisfied with it ourselves," is a philosophy that apparently pays well at Sier-Bath Gear and Pump Co., Inc., a North Bergen, N. J., jobbing plant which had the phenomenal record of only \$8.50 worth of rejections in over \$3,500,000 worth of gears produced for the armed services during the war.

The company, which produces special gears for all purposes including aircraft, hydraulic gear type pumps, etc., has recently introduced a new neoprene sealed gear coupling, figure 1, having internal and external sliding teeth. The hub teeth are cut radially for perfect alignment, without excessive backlash. The design permits use of many fewer parts than in conventional gear couplings, it is said.

Here is what happens to a typical gear as it goes down the production line:

1. After the blanks are turned in machines that will handle that particular quantity and design most economically, they go to an air conditioned gage room, figure 2, for 100% inspection, before any further machining is done.

2. The next operation, figure 3, broaching the keyway or splines on a Colonial universal horizontal, is followed by a set-up check for parallelism and size. Experience here has shown that if the first few gears are OK, 100% inspection of the blanks at this point is not necessary.

3. Blanks are now counterbored and

drilled and again followed by a set-up check.

4. Blank bores are now finished on a Borematic to "go" and "no-go" gage accuracy.

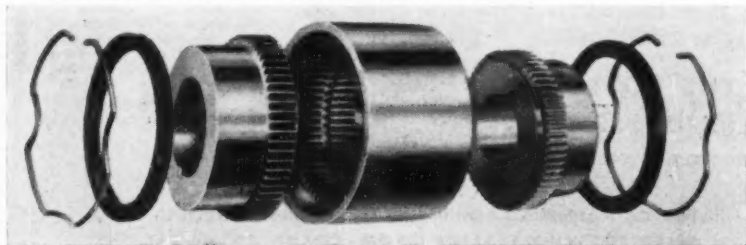
5. Teeth are hobbled or shaped as the case may be and the gear is then cleaned, burred and stamped. It now goes to a second air-conditioned gear-checking room. Here, the accuracy requirements shown on drawings are checked. For heavily loaded gears and where quietness and long life are required, inspections for involute form, tooth spacing, lead and concentricity are made on Michigan Tool Co. Sine-Line involute and lead checkers, figure 4. A Red-liner check is also provided. A gear-checking recorder records lead and involute checks for comparative records later. In the same laboratory there is another Michigan machine on which all hobs are inspected completely after sharpening.

6. If the gear is finish ground, it also goes to a third room in which it is given a profilometer inspection for surface smoothness.

7. All hardened gears are magnafluxed. All tools are ground in a central tool room, and indicators are used on most machines to check tool setup after grinding, etc.

For the pumps which it produces in addition to gears, Sier-Bath has provided a dynamometer for 100% inspection as to output rating, etc. Pump gears are ground all over before gear cutting and

Fig. 1. New neoprene sealed gear coupling with internal and external sliding teeth. Hub teeth are cut radially for perfect alignment. This gear coupling has less than one-half the parts of conventional gear couplings.



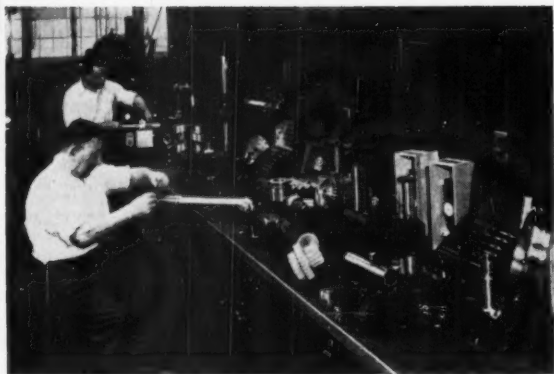


Fig. 2. Air-conditioned gage room at Sier-Bath for checking blanks.

Fig. 3. Broaching keyways or splines on a Colonial universal horizontal broaching machine. This operation is followed by a set-up check for parallelism and size.

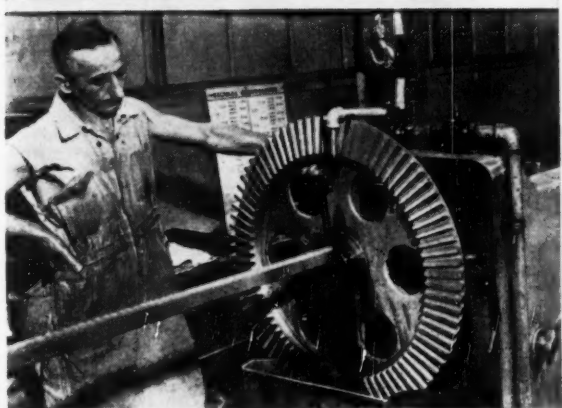
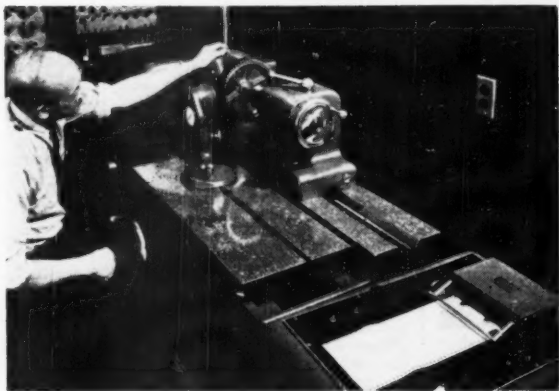
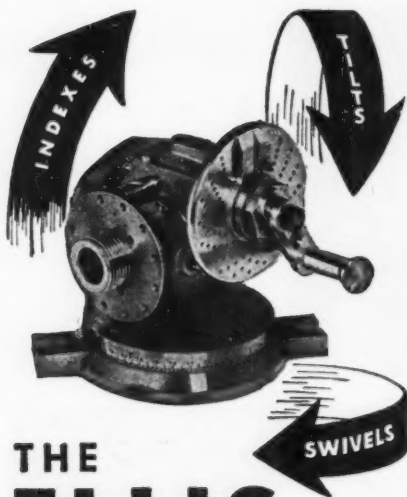


Fig. 4. Checking lead of a gear on a Michigan lead checker.







## THE ELLIS DIVIDING HEAD

Many unique features make the ELLIS Dividing Head more than an ordinary indexing fixture. It is a precise, rugged unit with  $6\frac{1}{2}$ " normal swing increased to 11" swing through the use of riser blocks. It TILTS more than 100 degrees in the vertical plane—SWIVELS 360 degrees in the horizontal plane—INDEXES by crank, or directly by hand. Work is held between centers, or in chucks or collets. The ELLIS Dividing Head is a universal work head that will increase the production versatility of your milling machines, grinders, drill presses and jig borers—write for complete details today.



50-G CHURCH STREET  
NEW YORK 7, N. Y.

tested to tenths of a thousandth for runout. Gears for aircraft are subjected to a further examination on a comparator, located in the same "ultra-precision" laboratory as the profilometer.

A modern carburizing and heat-treat department with all furnaces electrically controlled to maintain accuracy, and a complete metallurgical laboratory, also are important factors in assuring product quality.

With such equipment and procedure, Sier-Bath has little trouble in holding rejections of finished products to practically zero in the plant—a benefit which goes far in paying for the added inspection operations performed.

A further result of the continuous maintenance of precision is that it gives the men in the plant a pride in workmanship to supplement their own financial interest in the plant. Sier-Bath is proud of the fact that it has never had to make a time-study in the plant for rate setting purposes; another evidence of the personal pride in work performed by the men in the shop.

Equipment in the plant is continuously subjected to preventive maintenance.

The efficiency of the entire setup is illustrated by a recent order for gears for sound recording equipment—helical gears to mesh with worms. The sample furnished checked to .0006" to .0007", with .0035" runout on the blanks furnished. Sier-Bath put them over its hobbing line and the finished gears checked to .0001" to .0002 inches.

Harry Emerson Sloan, president and treasurer of the Cushman Chuck Co., Hartford, Conn., celebrated his fiftieth anniversary of his business life with the company on October 3, 1949.

His activities began in the manufacturing department and have progressed through engineering and executive phases of the business. Mr. Sloan has obtained many patents for pioneering steps, both in manufacturing processes, product design and for development of new equipment to meet modern machine tool needs.

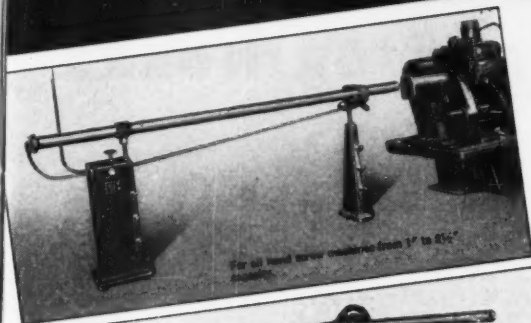
Larkin Lectro Products Corp., announces the relocation of their entire facilities to a larger plant in Pine Bluff, Ark.

They will manufacture arc and resistance welding equipment as well as power and distribution transformers with deliveries scheduled to begin December 1, 1949, from their new location.

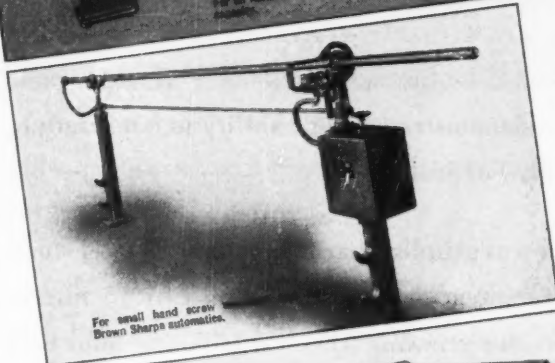


# **IN ONE FEED-OUT**

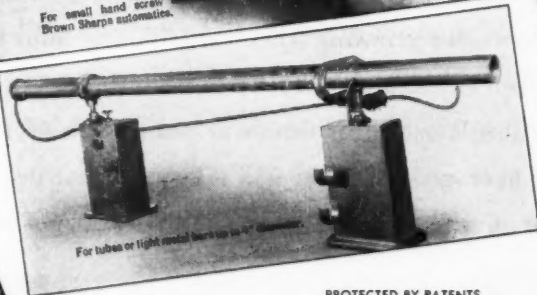
can you feed any desired length  
up to full length of stock?



For all hand screw machines from 1" to 8 1/2" diameter.



For small hand screw Brown Sharps automatics.



For tuben or light metal bars up to 1 1/2" diameter.

## **LIPE**

**P N E U M A T I C  
B A R   F E E D S**

*Will do it!*

LiPe Bar Feeds make long feed-outs possible. The piece is not grabbed by feed fingers; instead, it is pushed automatically by an air driven piston.

Feed-fingers and feed-finger mechanisms are eliminated entirely, yet these Bar-Feeds will feed any required distance right up to the smallest end-piece. This is done without marring, scratching, or deforming. A fast, safe method that steps up production, saves spoilage!

**LiPe Bar Feeds Are Made For Any Type Machine Where Stock Is Fed Through A Spindle.**

You can get a LiPe Bar-Feed for your automatic or hand-operated screw machine, however small or large it may be.

**WRITE or CALL US  
TODAY!**

for complete descriptions and engineering data on the LiPe Pneumatic Bar Feeds. No charge or obligation, of course.

PROTECTED BY PATENTS



**LiPe-ROLLWAY CORPORATION, Syracuse 1, N. Y., U.S.A.**

Cable Address: LIPEGear

## **HOW TO DOUBLE OUTPUT ON SURFACE GRINDERS**

**T**HAT'S NOT SO DIFFICULT AS IT SOUNDS.

Whether you're working on tiny pieces or 30" x 3" bars, you'll get better results from your surface grinders when they are equipped with Robertson Cool-Cut Wheels. Time and time again, Robertson Wheels have demonstrated their ability to cut grinding time in half — *or better*. For instance:

This manufacturer was grinding hardened and soft steel stock on a Mattison surface grinder to a required finish of 15 micro-inches. With a conventional grinding wheel, it took one hour and 30 minutes to do all four sides. When he switched to a 20" x 6" x 10" WA 362-IVC Robertson Wheel, this time was reduced to 45 minutes. Stock removal averaged .030" to .035". Table speed was reduced to 40 feet per minute and cross feed to the lowest position.

In addition, the Robertson Wheel required less truing than the conventional wheel and did its job with little or no wear.



This manufacturer increased his productivity 100 percent . . . and did it at lessened wheel costs!

Results like these are not rare, but are being achieved daily with Robertson Wheels in machine shops all over the country. It will pay you to find out how much more, and better, work Robertson Cool-Cut Wheels can do for you. Send for your free copy of the interesting pocket booklet "How to Buy Production Time."

**ROBERTSON MANUFACTURING COMPANY**  
**TRENTON 5, NEW JERSEY**

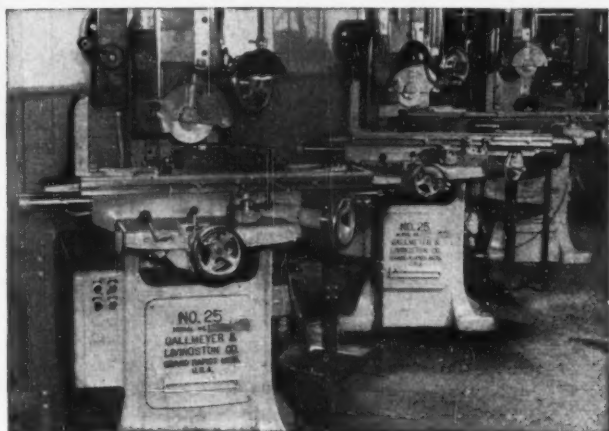
Resin-Bonded and Vitrified-Bonded Grinding Wheels • Mounted Wheels • Segments

When Writing Advertisers Please Mention MACHINE and TOOL BLUE BOOK



# **E**nthusiastic Customers do our BEST advertising

*In one of the world's largest electrical equipment plants, three of a battery of eight Grand Rapids No. 25 Hydraulic Feed Surface Grinders precision grinding lamination dies for motor stators.*



**You** will appreciate the micro-inch finish produced at production speeds on Grand Rapids Grinders. All Grand Rapids Hydraulic Feed Surface Grinders have these outstanding features:

1. One-piece column and base casting for vibrationless rigidity
2. Precision ball-bearing spindle which is greased for life
3. Bijur one-shot lubrication system eliminating hand oiling
4. Patented vertical movement of wheel head for quick, accurate adjustments
5. Portable coolant tank for ease of coolant replacement
6. Vane type hydraulic pump for fast longitudinal table travel

*to serve you—*

Your inquiry concerning your specific grinding needs will receive prompt attention. Grand Rapids Grinders include: Hydraulic Feed Surface Grinders, Universal Cutter and Tool Grinders, Hand Feed Surface Grinders, Drill Grinders, Tap Grinders, and Combination Tap and Drill Grinders.

**GALLMEYER &  
LIVINGSTON**  
COMPANY

405 Straight, S. W., Grand Rapids 4, Mich.

**GRAND RAPIDS GRINDERS**

# THE FOREMANSHIP FORUM

By Edmund Mottershead

## THE FOREMAN LOOKS AT THE PERSONNEL DEPARTMENT

The problem of cooperation between foremen and personnel directors is one which has plagued PD's and foremen alike for quite a while. Both have a job to do, and in many cases have so concentrated their attention and habitual thinking on the job itself that some difficulty is experienced in seeing beyond that job to the problems of the other party.

It is probable that most personnel directors, having contacts with all departments in an organization, have a better over-all view of things than the average foreman; consequently they have a better picture of the over-all personnel needs of the organization as related to production plans, marketing policies and related factors.

However, the mission of the personnel department may vary from one organization to the next, fundamentally it is concerned with the problems of selecting personnel, placing them on the job, training, induction, orientation, personnel control, and personnel welfare. Most, if not all, of these functions depend for their successful execution upon exact and accurate information received from the operating departments.

As a result, the continuing cry from personnel directors for the cooperation of foremen in carrying out their work translates readily into a demand on the one hand for accurate information, and on the other hand for execution of the plans and programs of the PD.

Let us take just a few typical examples of situations where difficulty occurs due to lack of cooperation. There is the complaint of the foreman that the personnel department is not providing competent workers when vacancies occur. "That silly girl in Johnson's office looks in a book and asks a guy three questions

to see if he knows anything and then sends him down to me as a machinist. Why that fathead doesn't know which end of a wrench to pick up!"

Another frequent grouse concerns the burden of training lately imposed on foremen. "They send me a bunch of greenhorns that don't know anything and don't want to learn anything and expect me to teach 'em and wet nurse 'em. I would would be better off doing the work myself." (And many of them do.)

"I haven't got the time to spend taking a new man around and introducing him to everybody and teaching him his job and handling the reports on him and all the rest. The front office wants me to get out production. If the PD wants all this monkey business, why don't they get somebody to do it instead of wasting my time?"

And then there is the matter of reports . . . records . . . job evaluations . . . rates . . . grievances . . . suggestions . . . safety training . . . and so on.

It all adds up to one thing: the personnel department has a sales job to do, a sales job to get information, and another selling job to get the foremen to follow through on a program.

Let's look at it this way. Personnel departments have developed in industry for the most part in one of two ways. In one type of situation, the hiring and firing of "personnel" work started out with department heads, foremen, or plant superintendent. The burden of this increased until some clerk or stenographer was assigned to handling the application forms, preliminary interviews etc. Nine times out of ten the job developed until a personnel department was established, often with the original clerk running the show, still thinking of personnel procedures in the limited terms of the original experience.



## ARE YOU COMPETING AGAINST TOOL PERFORMANCE LIKE THIS ?

**REAMED 112,175 CAST  
IRON PULLEY SHAFT HOLES  
OVER PERIOD OF 1½  
YEARS — WITHOUT RE-  
PLACEMENT — EXPANDED  
ONLY!\***

### Staples Carbide- Tipped, Shell Type Expansion Reamer

(Patented)

This Staples Carbide-Tipped Shell Type Expansion Reamer has an unusually wide variety of applications. Tool is expanded by driving shell up tapered arbor. Uniform parallel expansion the full flute length is maintained, permitting easy adjustment to .0001". As the shell is a standard item, a new tool is obtained simply by replacing the worn shell.

Many design variations of this tool are possible, including use of two shells of different diameters for step reaming. If you are interested in obtaining maximum economy from your reaming operations, by all means investigate this outstanding Staples development.

\* Actual tool performance report on turret lathe operation submitted by a large midwest manufacturer.

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*Distributors in Major Cities*

**Staples**

Complete tool catalog sent on request.

**CARBIDE-TIPPED CUTTING TOOLS**

A COMPLETE LINE OF SINGLE AND MULTIPLE POINT CUTTING TOOLS  
EXPANSION REAMERS • FORM TOOLS • CENTERS • MASONRY DRILLS  
• SPECIAL TOOLS

The other situation occurred where the top management, tired of the old ways, and tired of having a lot of buck passing on hiring and firing and grievances from one department to the other, stepped out and hired a personnel director or industrial relations director, set up a department, and sat back in the happy feeling that finally they had someone who could hold all the hot potatoes they had been tossing around amongst themselves.

In the first instance we have an individual who by this time may or may

not have a good grasp of personnel work, but who is inevitably bound by the limitations of his mission imposed upon him by the limited thinking of both top management and the department heads. In the second case we have an individual who may be competent, well trained, but who is not familiar with conditions in the organization, in some cases is not familiar with production processes and job requirements, and is consequently at a disadvantage. In both instances, the foremen tend to resent the "interference" of the outsider.

Put it this way: when we invent a new machine or develop a new method, the basic purpose is to eliminate jobs, eliminate manpower needs for the particular operation. The basic mission of the personnel department can only be justified if it takes work off the shoulders of the foremen instead of burdening them with more reports and respon-

sibilities. A personnel department is only justified when it can perform its mission as a highly specialized staff department better and more economically than the same mission can be performed by the various department heads.

This principle underlies much of the criticism levelled at PD's by foremen and most of the difficulty personnel departments have in getting full cooperation from foremen. Whether in fact the mission of personnel selection and placement and control is better carried out and more economically performed by





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the  
**HANDY HAMILTON**  
PORTABLE ELEVATING TABLE

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**Three  
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**One man  
can safely  
lift and carry  
loads  
usually  
requiring  
the strength  
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**ELEVATES • LOWERS • TRANSPORTS**

Table locks securely wherever stopped.

**WILL NOT TIP OR SLIP**

A work bench when and where you need it.

**WRITE FOR BULLETIN**

giving detailed data

**DO IT NOW**

*You may need this handy helper soon.*



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*Hamilton*  
**TOOL COMPANY**

SUPER SENSITIVE DRILLING MACHINES  
TAPPING MACHINES - PORTELVATORS

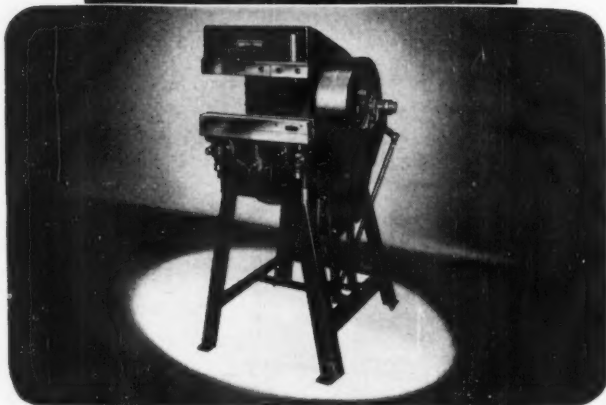
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TOOL COMPANY

39 YEARS EXPERIENCE



## WHITNEY-JENSEN

### No. 247 PRESS BRAKE

Production shops turning out quantities of small formings in large presses and job shops requiring a small brake, will find the No. 247 a cost reducing, space-saving piece of equipment. Capacity of the machine is 14 ga. mild steel over  $\frac{7}{8}$ " 90° V die or  $4\frac{1}{2}$  tons.

Strokes per minute — 47

Throat height —  $11\frac{1}{2}$ "

Throat depth —  $6\frac{1}{4}$ "

## WHITNEY METAL TOOL COMPANY

115 FORBES STREET, ROCKFORD, ILLINOIS

the PD is of no consequence. In handling grievances, it is accepted as sound principle that an imaginary grievance must be treated as a real grievance in order to be eliminated. Personnel departments thus have a "real" selling job to do, whether the facts of cost accounting justify their existence or not.

How can the personnel department best go about this selling job? Much will depend upon individual needs and local circumstances, but the following outline, based upon steps taken by a number of different concerns to meet this problem may be modified or adapted to suit.

actually carry out the job at the point of contact with the workers.

5. Compare this list with the course-of-information list. It will in many cases be revealed that the course of information and the person responsible for follow-thru on the particular personnel function is the same individual. Question at this point: "If the same person must collect information for the PD and carry out the program of the PD . . . is the PD as such increasing or decreasing the work load on the supervisor?" If the personnel department is actually increasing the workload on the supervisor, there is something of a problem to elim-

1. Establish in writing a definite list of the functions of your personnel department, itemized as to individual tasks involved. (We emphasize the "in writing" simply to bring about a clear thinking that the effort of writing usually demands.)

2. Corresponding to this list of functions and tasks, make up another written list of the nature of the information required by the PD to carry out these functions. Add to this a short note in each case as to where and how the information is at present obtainable.

3. Look over the information-needed list and sources of information and check each one to see if the same information could possibly be obtained more easily elsewhere.

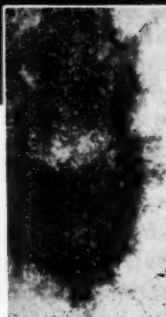
4. Corresponding again to the list of functions and tasks, make up a third list of the persons who



**NO MORE**  
painful  
sharp  
slivers  
like  
these ➡



— **INSTEAD**  
harmless  
powdery  
chips  
like  
these ➡



## with the **P&W** **KELLER CARBIDE**



The fluting does it. "Diamond" center-fluting, uniform spacing and correct rake angles eliminate the hazardous nuisance of annoying, needle-like slivers... produce the granular chips shown above that are kind to operator's hands. Keller Carbide DI-BURS are easy to control — leave fine finish on tough die steels, even at slower speeds — remove metal fast — have longer useful life.

Consult the P&W Keller Bur Catalog for the profitable solution to any burring problem. A post card will bring your copy by return mail.

## **KELLER** **CARBIDE DI-BURS**

# "E" J&L FREE-CUTTING STEEL

- ★ New Bessemer Screw Stock with Proved Machinability Ratings as High as 170!
- ★ Backed by 50 years of leadership in the field of free-machining, cold-finished steels.
- ★ Proved by exhaustive field testing.

## Machine-shop operators report:

- Better machine finish
- Longer tool life
- Higher speeds
- Machinability ratings up to 170
- Better response to forming and cold work
- Higher magnetic permeability

**WRITE** for complete information **TODAY!**

"E" Steel is quality-controlled from our own mines through the finished product.



**JONES & LAUGHLIN STEEL CORPORATION**  
468 Jones & Laughlin Building Pittsburgh 19, Pennsylvania

inate unnecessary paper work, reports, etc. It is of course possible that an increased workload on the supervisor in this area may be offset by decreased workload in other areas . . . less waste, scrap and rework or fewer grievances, but these compensations must be proved before the added burden of transmitting information to the PD and carrying out a PD program can be made acceptable to the supervisor.

6. At this point take the available data to top management and get top management approval for a series of foreman conferences whose objectives shall be:

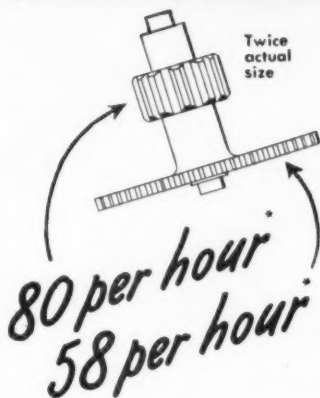
- a. simplified personnel procedures
- b. more accurate placement
- c. speedier on-the-job training
- d. reduction of grievances
- e. reduced lost time accidents
- f. reduced scrap, waste, rework
- g. reduced maintenance costs
- h. increased production at lower overhead costs.

It will be noticed that the last few items in this list seem somewhat apart from the normal mission of the personnel department. These last items, however, from a cost standpoint, are the only justification for the existence of the personnel department. The arrangement of the above topics as objectives is intentional. By asking the foremen how they think personnel procedures can best be simplified, you immediately begin to work on their own complaint . . . overburden of red tape, misplacement of workers etc. By talking next about worker training by speedier methods, you are again talking about something which will save the supervisor time, as with the reduction in grievances. By the time you get around to talking about reduced accidents, less scrap, lower costs and higher production, the foremen are in a better mood to listen to these basic justifications for your function.

Many foremen conceive of the personnel department as something in the front office (i.e. away from reality) which handles payroll, hires people they can't use and fires the ones they might have used and otherwise bothers them with training programs, movies, safety cam-



## 64 PITCH GEAR TEETH to .0005" limits at Low Cost



\* 50% higher output could be attained with less stringent limits

Instrument Gear Works in Chicago is a specialist in high-quality instrument gears. They have reason to be proud of the customers they serve and the efficiency with which the required fine-pitch gear precision is maintained. The background of accuracy control at this plant is reliance on a group of Fellows Fine-Pitch Gear Shapers tooled with Original Fellows Cutters.

If you have a fine pitch or small gear production job you owe yourself a thorough investigation of what can be obtained in both speed and accuracy from this Fellows 3-inch Machine. Contact our nearest office for performance figures on this and other significant jobs.

# Fellows

The Fellows Gear Shaper Co., Head Office and Export Dept., Springfield, Vermont. Branch Offices: 616 Fisher Building, Detroit 2; 640 West Town Office Building, Chicago 12; 7706 Empire State Building, New York 1.

paigns and related stunts. The fact that these varied efforts are aimed at reducing cost of production is not sufficiently apparent to them.

Consequently, as a conclusion, the experience in many companies would indicate that the soundest method of getting the desired cooperation from foremen and supervisors is to ask for their advice as to how you can best serve them and make less work for them; and in the process make it clear to them that the over-all results of your efforts are going to be reduced costs, more production, and a lighter burden of supervision from them . . . if they will just please give

you the information you asked for and follow thru on the latest safety campaign.

William H. Steinkamp, field sales manager of Brown Instrument division, Minneapolis-Honeywell Regulator Co., has announced the three following appointments: **Charles D. McIntire** has been named industrial sales manager of the Cincinnati branch office; **John E. MacConville** has been appointed industrial sales manager of the Atlanta branch office; and **William C. Waltman** has been put in charge of industrial sales out of the South Bend office.

## ARE YOU A TAPPING EXPERT?

By Professor Herman Reichardt

Count ten points for right answers in the first seven questions. Count three points for each item answered correctly in the eighth question. 87 to 100 is excellent; 72 to 87 is good; 60 to 72 is fair; and below 60 calls for a refresher course.

1. Tapping 100% full thread contributes to excessive tap breakage and torn threads.

True: False.

2. Tapping at slow speeds produces better results.

True: False.

3. The cutting size of the tap is determined by the major diameter.

True: False.

4. Carbon steel taps are the most efficient and fastest types of taps.

True: False.

5. The Whitworth thread form is common to:

1) U.S.; 2) Great Britain;

3) Germany; 4) France.

6. Toughness of taps is a measure of:

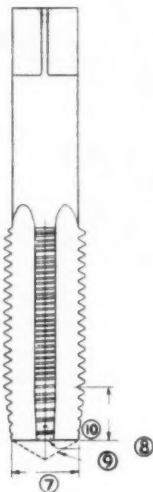
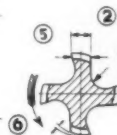
1) Carbon Content; 2) Ability to operate at dull red heat; 3) Resistance to torsion and impact stress.

7. The proper hole size, for a 1/2-13NC tapped hole with a 65% thread depth, would be:

1) Less than .450"; 2) .450";  
3) .500"; 4) More than .500".

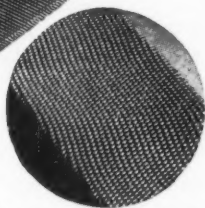
8. Here is a diagram of a tap. Identify the numbered parts by inserting the number before the proper description.

- |                     |                            |
|---------------------|----------------------------|
| ( ) Internal Center | ( ) Thread Relief (radial) |
| ( ) Cutting Face    | ( ) Flute                  |
| ( ) Chamfer         | ( ) Heel                   |
| ( ) Land            | ( ) Size of Square         |
| ( ) Point Diameter  | ( ) External Center        |



ANSWERS TO QUIZ ON PAGE 184.

For better work in less time  
 . . . at less cost . . . **USE**  
**DISSTON**  
**BITE-RITE FILES**



Staggered teeth eliminate file tracks . . . make finished surfaces smoother. Rounded gullets form curls instead of chips . . . thus to a great extent are self-cleaning.

**files that are DIFFERENT**

Different in design, in performance, in results. And those differences combine to improve workmanship at a saving of time and money. Here are the reasons:

Instead of being cut in straight rows, the teeth of Disston Bite-Rite Files are staggered. This enables you to cut straighter . . . when teeth are straight rowed, file tends to follow direction of rows. You can do smoother work . . . absence of tracking eliminates much refinishing. You can speed up your filing, for teeth are sharp-biting and hold their edges. And you can count on longer file life . . . lower file costs.

There are Disston files for all needs, including a complete line of Disston Swiss Pattern Files . . . precision made for precision work.

For other metal-cutting tools of extra quality, ask for DISSTON METAL CUTTING BAND SAWS . . . HACK SAW BLADES . . . CIRCULAR SAWS . . . CARBOLOY FITTED CIRCULAR SAWS . . .

Write for FREE folder, "What File?" showing recommended procedure in selecting proper file.



**HENRY DISSTON & SONS, INC., 1249 Tacony, Philadelphia 35, Pa., U.S.A.**  
 In Canada, write 2-20 Fraser Ave. Toronto 3, Ont.





## "ROCKWELL" *Superficial* HARDNESS TESTER

*... with many uses,  
but only one standard of precision*

• For research, supervision or control—in laboratory, toolroom or production line—tests made by the "ROCKWELL" Superficial are as representative of hardness as those made on the regular "ROCKWELL" Hardness Tester. Only requirement is that, since depth of indentation is only .005" or less, surfaces must be smooth and materials homogeneous for general testing.

This instrument is especially suitable for testing very thin material, nitrided or lightly carburized steel and areas too small for regular "ROCKWELL" Hardness Tests. A Wilson Field Service Engineer will be glad to discuss with you whether or not a "ROCKWELL" Superficial Hardness Tester will best serve your needs.



*BRALE is the only diamond indenter made to Wilson's precision standards for use on "ROCKWELL" Hardness Testers and "ROCKWELL" Superficial Hardness Testers.*

# WILSON

MECHANICAL INSTRUMENT CO., INC.

AN ASSOCIATE COMPANY OF AMERICAN CHAIN & CABLE COMPANY, INC.

ACCO

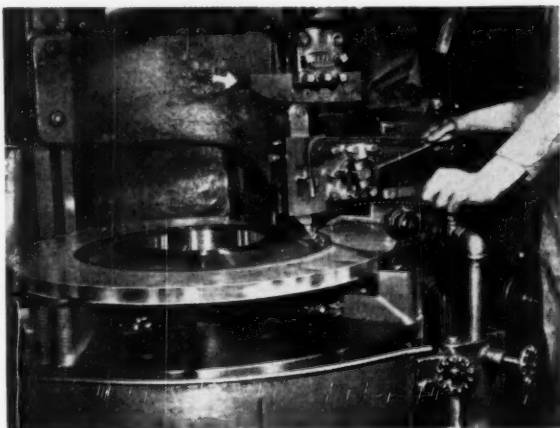


230-T PARK AVENUE, NEW YORK 17, N. Y.

# Modern Tools in action . . . . .

## USE OF A CAM BLOCK ATTACHMENT WITH A VERTICAL TURRET LATHE

Cam Block materially speeds the production of turbine disks at Westinghouse's Sunnyvale, Calif. plant. The disk being contoured in the picture is for a big steam turbine. The cam plate (arrow), which is in contact with the roller, has the exact profile required. The various types of turbine disks made at the plant, although generally similar in outward appearance, differ considerably in their exact contours and dimensions, as they are designed for various stages of the turbine spindles. With this attachment, it is a simple matter to change to the desired cam block profile. Turbine disks are usually ordered in quantities of 200 or more and often time is an important factor in their production. The cam block application makes it possible to make disks simultaneously on different machines. Using this method, a machinist



can contour a disk completely in two hours or less. Shop flexibility is improved, since the contouring does not tie up any one machine, or require waiting for any particular machine or operator to become available.



## PORTABLE METAL BRAKES

Well balanced, easily operated sturdy construction. Equipped with two screw type clamps to afford easy bench mounting, also other styles—literature on request. DEALERS WANTED.

F.O.B. DETROIT—NO C.O.D.'s

**G & S MACHINE SHOP**

**10" BRAKE only \$10.00**  
Capacity 18 Gauge CRS

**18" BRAKE only \$39.00**  
Capacity 18 Gauge CRS

**24" BRAKE only \$50.00**  
Capacity 20 Gauge CRS

**DEPT. A-2, 8700 GRINNELL**  
**DETROIT 13, MICHIGAN**

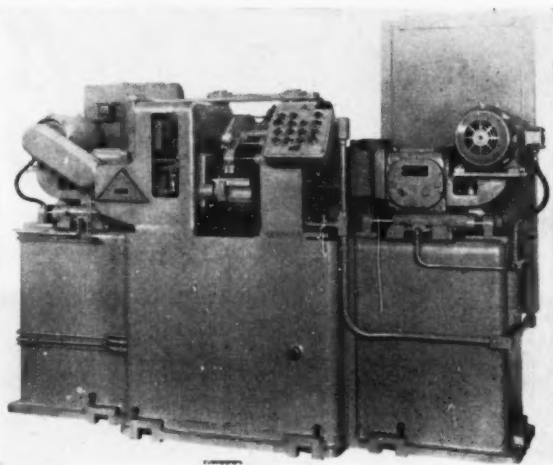
## AUTOMOTIVE ADJUSTING SLEEVE FOR STEERING CONNECTING ROD

Machine consists of fabricated center base supporting three-station trunnion, two cast iron end bases, each supporting No. 150 Lead Screw Tapping Unit which carries 4-spindle tapping head.

At each of three trunnion stations a double holding fixture is mounted, each holding two split sleeves. In loading, parts are placed in position and a sliding guide is moved into position, which keeps parts in place until they reach the second station, where they are hydraulically clamped, then tapped and unclamped. At the third station they drop into a finished part chute. Four parts are tapped in each end at each cycle.

Operation of the machine cycle is automatic after parts are loaded and cycle button is pressed. Coolant is provided to all taps.

Production is approximately 480 pieces



per hour at 100% efficiency, allowing 28 seconds for loading. Machine is a LeMaire Two-Way 8-Spindle Horizontal Lead Screw Tapping Machine to tap 4 split sleeves at each cycle, with automatic unloading of parts.

## CHECKING LARGE MACHINIST'S SQUARES

by H. L. Cook

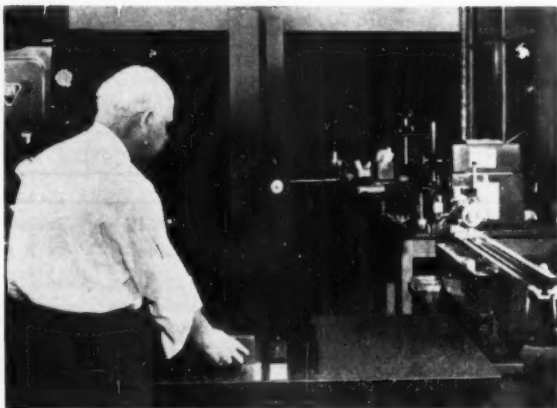
Checking of large machinist's squares, used extensively in the production departments of The Warner & Swasey Company, has been facilitated by a new checking instrument.

The new device is direct-reading, and use of feeler gauges and tissues in connection with a master square is eliminated.

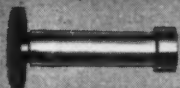
The principle adopted is the same used by draftsmen in checking celluloid triangles — a perpendicular drawn with the triangle in one position is checked by reversing the triangle.

The instrument consists of a rectangular steel bar, normalized, hardened and ground, which is suspended vertically

from a heavy welded steel frame by means of a ball bearing pivot. At the bot-



## WHICH ONE? NAME YOUR SPINDLE



**P-1**

8" dia. wheel; housing dia. 3 1/4" over-all length 15 1/2"; max. speed 6000 RPM.



**P-32T**

Direct Motorized Cartridge Type Grinder Spindle.



**P-2500**

from 3/4 to 20 HP. Ask for Catalog 88.



**INTERNAL**

Internal Grinding Spindle for every requirement. Ask for new Catalog 57.



**P-274**

New belt driven Spindle for No. 2 Cincinnati Cutler Grinder.



**P-666**

Heavy Duty Wheel Head Spindle; over-all length 25 1/2"; center height 3"; foot type housing 18 1/2" long x 8 3/4" wide; max. speed 4000 RPM.



**P-693**

High cycle, 16,000 RPM, totally enclosed fan cooled 1 HP motorized spindle, over-all length 18 1/2"; barrel dia. 3".



**P-5793**

3, 5 or 10 HP, heavy duty deep hole grinding Spindle; 1800 or 3500 RPM; barrel dia. and length to specifications.

# POPE

TRADE MARK REG U.S. PAT. OFF.

builds into these Spindles the precision performance and long life that results in better work and more of it. Get the facts and figures on the one best Spindle for your job.



**P-531**

Boring Machine Spindle for Diamond or Carbide Tools; over-all length 20"; center height 3"; base 14 1/2" x 8"; max. speed 5000 RPM.

**SPECIAL SPINDLES  
YOU NAME IT**

Send us your specifications for a quotation.

Check  
and  
Mail  
This  
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Pope Machinery Corporation  
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Gentlemen:

Please send descriptive literature, specifications and estimates on the Pope Spindle types checked: P-1..... P-32T..... P-2500.....  
INTERNAL..... P-274..... P-666..... P-693..... P-531..... P-5793.....  
Special Spindles for.....

NAME.....  
POSITION.....  
COMPANY.....

No. 62

tom of the bar an indicator lever with a multiplying ratio of two-to-one is applied, so that when a square is placed against the bar, the latter swings to register any error for the entire length of the bar.

At the end of the pivot which extends beyond the back side of the supporting frame, a horizontal bar is mounted with weights at either end. These weights can be moved to equalize the pressure of the vertical bar against the square.

#### NEW MACHINE INCREASES PRODUCTIVITY ON PIPE FLANGE OPERATIONS

This new machine greatly reduces operating time in boring, reaming, threading and counter-boring on cast iron pipe flanges. The machine is equipped with a 3-jaw scroll and chuck, and will handle all size flanges from 3" to 16" pipe size. Murchey Special Full Receding Pipe Taps with quick-change chasers and reamer blades perform the boring, reaming, threading and counterboring operations in rapid succession. The machine is equipped with a worm and worm gear drive head and is arranged with sliding gears providing 2 speeds plus pick-off speed change gears. The operating cycle is as follows:

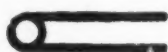
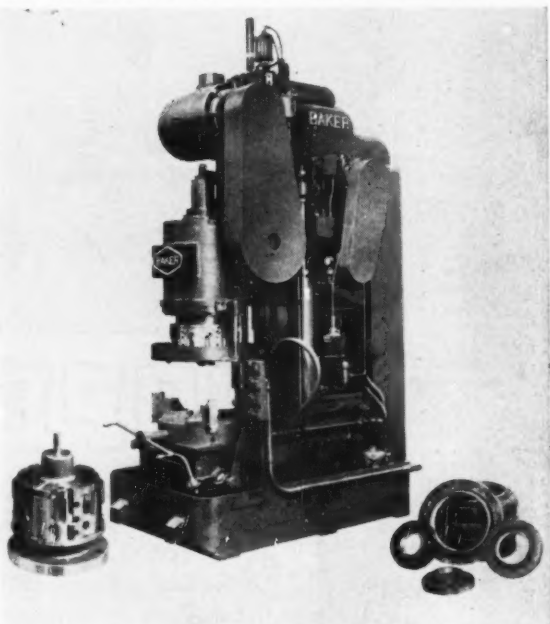
No. 1. Rapid advance of saddle through hydraulic feed pressure to predetermined point where taper reaming operation begins. Cycle controlled through limit switches.

No. 2. Half nut closes providing positive lead screw feed of saddle for reaming, tapping, and counterboring operation.

No. 3. At a completion of operations, half nut opens and saddle is rapidly re-

turned to raised position by hydraulic pressure.

Machine is a Baker Brothers, Model 30 H 04.



CLOSED

TRADE



CLOSED

MARK



Plain Type

Offset Type

## CONTINUOUS HINGES

All hinges shown can be furnished with special holes, cutouts and bends to blue-print in metals to suit the job.

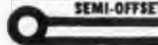
**AUTO MOULDING  
& MFG. CO.**

**1110 E. 87TH ST.  
CHICAGO 19, ILL.**

**SPECIFICATIONS:**  
Open Width  $\frac{1}{8}$ " to 6"  
Gate Material .040 to .125  
Pin Diameter .101 to  $\frac{1}{8}$ "  
Lengths to 120"



THREE-FOURTHS OFFSET



SEMI-OFFSET

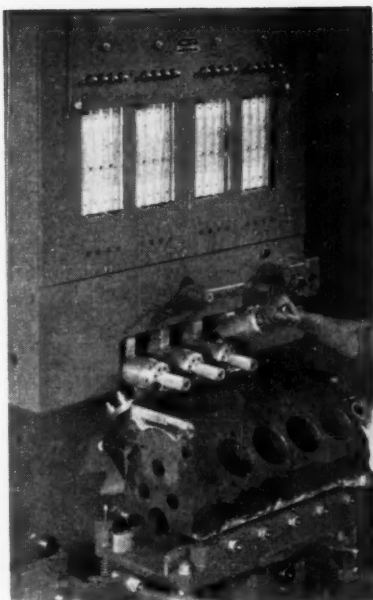
### CYLINDER BLOCK GAGING MACHINE

A specially designed gaging machine accurately checks each of the bores in the V-8 motor block at four different points and the operator manually stamps the classification for proper assembly. Through the use of this machine it is possible to greatly reduce inspection costs and improve quality by the elimination of the possibility of human error.

The cylinder block comes directly to the gaging machine on a roller conveyor where it moves into position on a turntable. It is locked in the proper locating position by hydraulically actuated shot pins. The operator then lowers the four gaging spindles into the cylinder bores by pressing the electrical "down" button to start the inspection operation.

Should any of the spindles fail to enter the cylinder bores, a micro-switch will stop their downward travel instantly and signals, one for each spindle, show where interference is being encountered. The spindles are then retracted, a safety feature that prevents damage to them as well as to their cylinder blocks.

Each gaging spindle has four sets of air jets to make four separate checks in each bore. The positions of the floats in



## To Increase Production and to improve efficiency use Butterfly Filing and Die Making Machine

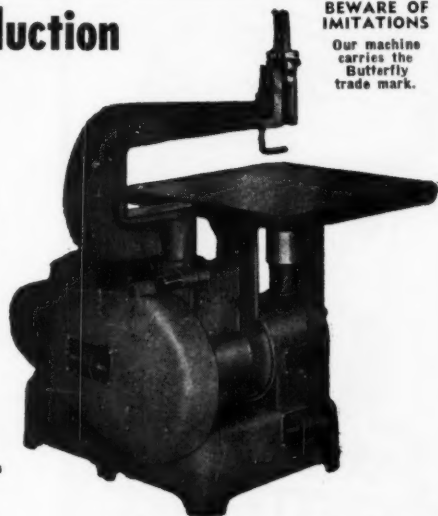
This is a powerful machine, for heavy or small precision work in use all over the world: Airplane Factories, Ammunition Plants, Toolrooms where fast production is desired. 4 Models, No. 16, No. 14, "EL" and Model "D". The larger the model, the larger the stroke and therefore more filing is performed, furnished with or without pedestals.

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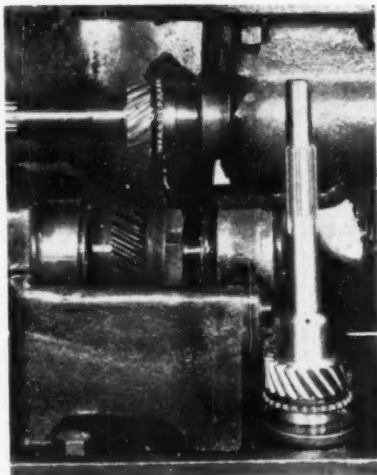
the 16 glass tubes indicate if each bore is within specified tolerance limits for taper and diameter. By turning a handle directly under the glass tubes, the operator rotates the spindles 180° and obtains a full 360° check for out-of-round.

The float position of one designated tube in each group of four indicates the classification in steps of .00025". The operator stamps this information on the block with symbols, using a manually operated device.

The gaging spindles are then retracted, the turntable is rotated 180°, and the same procedure is followed to inspect the opposite bank of four cylinder bores. Then the shot pins which lock the block in position are released and it is pushed onto the conveyor line by the next one to be gaged. Machine is a Sheffield Precisionaire.

#### PRODUCTION OF DRIVE GEARS SPEEDED

Finishing time for helical "shoulder" gears for a popular half-ton truck has been cut more than in half—to 32 seconds (floor-to-floor time) — and overall tool cost per gear has been reduced through the use of "underpass" shaving at New




Process Gear Corporation, Syracuse, New York.

One of the gears for the ½-ton truck transmission is shown between the machine centers in the accompanying photo. It has 17 teeth with a 34° left hand helix angle. Diametral pitch is 7.954; pressure angle is 20°; and pitch diameter is 2.137 inches. The gears—of S. A. E. 4027 steel—come to the shavers with between .006 and .008 inch measured over pins stock left for shaving the teeth. Machine operation is automatic except for loading.

With the former shaving method, some cutter breakage was experienced due to interference with shoulders. This interference has been eliminated in the new setup. Machine is a Michigan Tool Co., Underpass Rotary Shaving Machine, Model 860-A.

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5/8" x 2"	......46 "
5/8" x 3"	......52 "
3/4" x 2"	......60 "
3/4" x 3"	......70 "
1" x 4"	.....1.40 "

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tool was made for each different detail.

The Van Norman Company, Springfield, Mass. had a problem of this nature when building the tools for machining two of the details used on the milling machines which they manufacture. In the illustration Fig. 1—"A" is shown the Knee Shifter Fork used on the worm shaft and detail "B" is the Knee Shifter Fork used on the input shaft. Both these details are made of cast Kleinite. It will be noticed that on both details two .501 inch holes have been machined in similar positions. After these holes have been machined the next operation is milling the top rack. Following this job a rack is milled on "A" with 13 teeth 16 D.P. and on "B" a rack is cut with 18 teeth 16 D.P. as the next operation.

The fixture used for these two jobs is made with a cast iron base "A" finished on the surfaces "F". The base is cast with openings on the two sides in the center line of the casting. A slot is machined in the bottom surface in which is fastened, each with a socket head screw, two machine steel tongues "B", which have been made to be a good sliding fit in a slot of the machine table, figure 2.

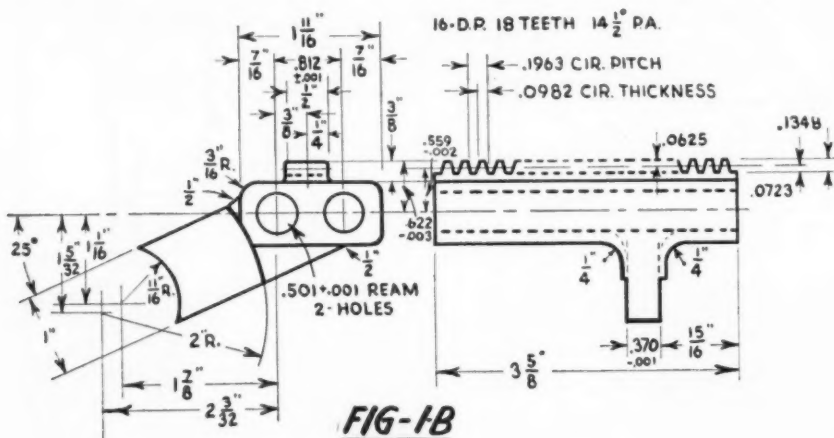
The upper finished surface of the base is fastened with two socket head screws and two dowel pins, tool steel, hardened and ground, block "C". In this detail two  $\frac{3}{4}$  inch holes, .812 inch apart have been carefully bored and then lapped. After this block has been attached to the fixture base, two  $\frac{3}{4}$  inch holes, "D" and "E", are machined in alignment with

the two holes in the block.

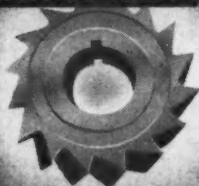
In the hole "D" is driven a tool steel bushing "F" which has been hardened after machining and then a .5005 inch hole ground and lapped. A bushing "G" is machined with a hole smaller than  $\frac{1}{2}$  inch for a depth of 1-3/16 inches and the balance of the bushing a hole is drilled and then tapped with 3/8-16 threads, loose fit. This bushing is then hardened and the larger hole is then ground and lapped to .5005 inch. The bushing is then driven into the hole "E".

Two locating plugs "H" are provided, one machined to the full lines and the other plug made to the dotted lines. These details are made of tool steel and after being machined are hardened, then ground to a good sliding fit in the hole in the block "C", bushing "D" and the hole in the workpiece. The outer ends of the plugs are knurled and a hole drilled to provide a convenient medium for placing or removing them from the fixture.

The other two locating plugs "J" are also made of tool steel, hardened and ground to be a good sliding fit in the block "C", bushing "E" and the workpiece. The left hand end of these plugs is machined with a  $\frac{3}{8}$ -16 threads and at the right hand end is fitted a malleable iron knob. By referring to Fig. 1 it will be seen that there is a difference of one inch in the length of the two details. On the locating plugs, "H" and "J", there is also a difference of one inch on the lengths of the  $\frac{3}{4}$  inch portion as shown



CUTTING TOOLS



DIES

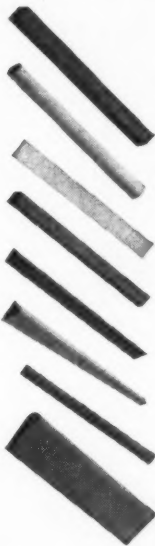


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by the full and dotted lines.

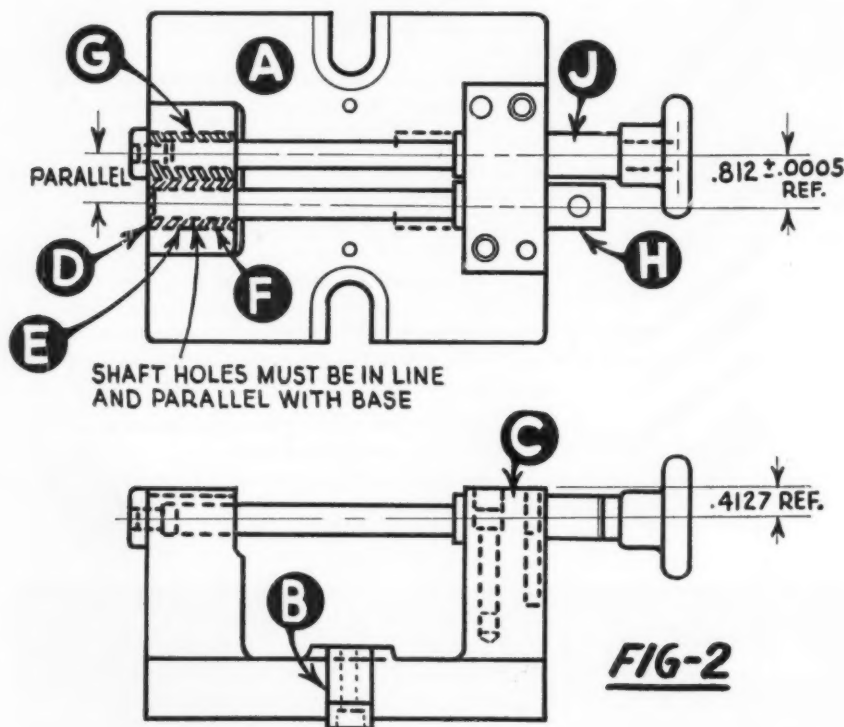
To use the fixture: The fixture is placed and located on the milling machine with the two keys "B" which fit into one of the table slots. Two T-head bolts are placed in the table slot and through the two openings in the fixture base. Hexagon nuts are then tightened on the bolts to hold the fixture securely in place. The proper milling cutter is fastened on an arbor and placed in the machine in the conventional manner. The correct tool setting gauge, for the detail to be milled, is placed on the block "C" and the table with the fixture adjusted until the face of the milling cutter contacts the gauge.

One of the pieces to be machined is then placed in the fixture opening and the proper locating plugs, depending on whether it is "A" or "B" (Fig. 1) are placed through the holes in the block—"B" through the holes in the workpiece, and into the bushings "D" and "G". The

knob on the locating plug "J" is then turned and as the thread on the plug is screwed into the thread on the bushing "G" the workpiece is moved to position with the shoulder on the locating plug. The machine is then started in operation, the table with fixture fed under the revolving cutter and the top rack surface is milled.

To remove the workpiece it is only necessary to first screw the locating plug "J" out of the bushing "G" and then slide it out until it is clear of the workpiece. Then slide the locating plug "H" until it is clear of the piece which can then be lifted out of the fixture.

The fixture is also used when milling the rack teeth, which is the next operation. However, the usual shop procedure is to mill the top rack on a complete order before changing, thus keeping to the smallest amount the machine change over time. When milling the rack teeth the fixture is located and held as described.







The cutter for the operation is placed on the machine arbor and fastened in its machining position.

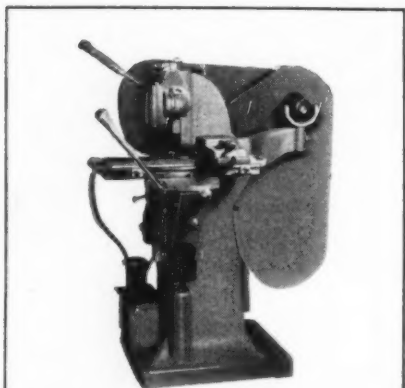
The correct tool setting gauge is again placed on the block "C" and the table moved until the face of the cutter contacts the gauge to give the correct depth of cut for the teeth to be produced. The machine is now started in operation, the table fed under the gear cutter, and the rack is milled. The finished piece is then removed from the fixture in a similar manner as described for the previous operation of milling the top rack.

This inexpensive fixture is used for two separate operations and on two types of workpieces. It is easy and quick to use, it holds the piece securely and positively, and with its use accurate results are obtained to meet the demands of this modern machine tool building concern. The fixture, therefore, can well be considered to be an efficient, high grade, low-cost production piece of machining equipment. THE END.

#### FORMULA FOR KEYWAYS

by George Phell

Engineering drawings are sometimes rather vague regarding exact dimensions for keyways and quite often details are

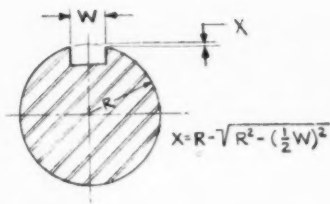


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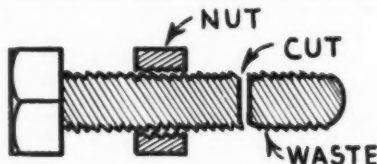
left to the good judgment of the shop supervisor or even to the mechanic who is doing the work.

The formula given in the accompanying sketch of a keyway in a shaft requires little mathematics and will be found to be useful to the inspector when checking keyways and to the supervisor or mechanic when laying out or cutting keyways in round stock.

#### SUGGESTION FOR CUTTING SCREWS

by Frederico Strasser

If a piece must be cut off a long screw it can be done easily and simply. Place a nut on the screw in any position be-

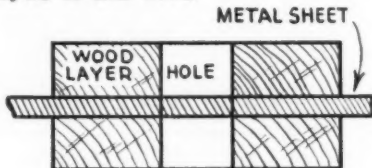


tween the cut and the head. After the screw has been cut, the burr created by the cutting operation will be removed by the nut as it is unscrewed.

#### DRILLING OF THIN SHEETS

by Frederico Strasser

It is extremely perilous to drill very thin stock. In order to avoid danger of cutting the fingers of the operator and also to eliminate the formation of burrs, it is best to form a sort of "sandwich", placing the metal sheet between two layers of thin wood.



# Available Literature

## CATALOGS, BOOKS AND INDUSTRIAL FILMS.....

**1. Tooling for Top Performance** on 44 Acme-Gridley Bar Automatic Jobs deals with records of 44 different machine set-ups in plants where Acme equipment is used. Tooling is analyzed, figures are cited. The company recommends the practices for guidance of plant expansion programs, disposal of obsolete equipment and for checking present tooling set-ups. **The National Acme Co.**, 170 E. 131st St., Cleveland 8, Ohio.

**2. "Case of The Metal That Was Caught,"** Bulletin 14B7217A, gives design and operation of the Allis-Chalmers metal detector which is designed to safeguard non-metallic products from contamination by metal particles and scrap. Metal detector spots metal particles as small as .039" in diameter. **Allis-Chalmers Mfg. Co.**, 70th St., Milwaukee, Wis.

**3. Lubrication Guide** gives needs of various parts of equipment as to the type of lubrication they require. Lubricants discussed are for tractors, trucks, buses, farm and road equipment. **Swan-Finch Oil Co.**, New York Central Bldg., 230 Park Ave., New York 17, N. Y.

**4. Euclid Universal Speed Reducers** is a bound, 28 page book giving technical data, worm gear reducers selection chart and description of the complete line of speed reducers. **Euclid Universal Machine, Inc.**, 15002 Woodworth Rd., Cleveland 10, Ohio.

**5. Multiple Point Pyrometer Indicator** is a general industrial temperature measurer for use in chemical processes, pilot plants, heat treating, power plants, plastic moulding, die casting and aircraft and diesel engines. Available thermocouples and heat ranges are listed. **Thermo Electric Co.**, Fair Lawn, N. J.

**6. Kennametal Tool Manual No. 6** covers the selection, application, and maintenance of Kennametal tools for lathes, boring machines, roller turners and planers. The 96 page, vest pocket size manual has many specifications and proper tooling procedures that make it a handy shop guide. **Kennametal Inc.**, Latrobe, Penn.

**7. Instruction Manual** for the installation, operation and servicing of Lodge & Shipley Duomatic lathes contains 32 pages of nomenclatures, specifications, installations and operations of the Models 2A and 3A lathes. Twenty eight illustrations and seven charts are included for ease of comprehension. **The Lodge & Shipley Co.**, Cincinnati 25, Ohio.

**8. Design Features** of the Clearing open back inclinable presses are presented in bulletin 211. Presses have capacity from 30 to 75 tons, and are adaptable to blanking, forming, drawing and assembly operations. Full specifications are given for all four models. **Clearing Machine Co.**, 6499 W. 65th St., Chicago 38, Ill.

**9. Form Grinding Service** for special high speed steel and carbide tools is pictured in folder offered to the industry. Illustrations show examples of type of tools produced to order. **J & S Tool**

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used in setups  
where it is im-  
practical  
to mount  
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10. Drilling units, which incorporate a centrifugal feeding device with full hydraulic control, have exterior adjustments for rapid approach, rate of speed and length of stroke. Six models are shown, and eight ways of setting up the drilling and tapping units. Govro-Nelson Co., 1931 Antoinette, Detroit 8, Mich.

11. Uses for eleven rust preventives in the Houghton line are charted in an 8 page booklet. Each type is outlined as to

physical properties, thickness and type of film, and the amount of coverage obtained. Comparative photographs show rust preventing qualities under test. E. F. Houghton & Co., 303 W. Lehigh Ave., Philadelphia 33, Penn.

12. "The Production Story" gives background, experience and principal products of the Production Machine Co. Also included is a description of the new experimental & demonstration laboratory built by the company. Production Machine Co., Greenfield, Mass.

13. Strip Steel, Spring Steel Strip, stainless strip and wire, tempered spring steel, brass and bronze strip, tool room specialties, and weight tables are among the stock listings of the 98 page book offered in catalog No. 50. Many other facts, such as rust prevention in storage, hardness tables, etc., are also printed. Precision Steel Warehouse, Inc., 4409-25 W. Kinzie St., Chicago 24, Ill.

14. Technical data on relay ratings, dimensions, coil specifications, and applications are included with the description and illustration of the seven standard types of magnetic relays for industrial and general purpose control applications. Ward Leonard Electric Co., Mount Vernon, N. Y.

15. Hydraulic Tubing from 1/8 to 1-1/8 inch OD, in wall thickness for every practical operating pressure is listed in

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Bulletin 38. Dead soft annealed tubing, temper no. 1, is furnished for hydraulic applications. All tubing is given 100% hydrostatic test. **Superior Tube Co.**, 2182 Germantown Ave., Norristown, Penn.

16. Thread Milling Cutters for Pratt & Whitney thread milling machines is a size, price and specification folder to be used in ordering single and multiple cutters. Cutters are furnished in National, V, Acme or Worm thread forms. **Pratt & Whitney, Div. Niles-Bement-Pond Co.**, West Hartford 1, Conn.

17. Air Control Valves can now be se-

lected from chart described in Valvair folder 'A'. Ten air valves, with different types of controls, are illustrated along with five air exhaust systems used in valves. **Valvair Corp.**, 454 Morgan Ave., Akron 11, Ohio.

18. Automatic Reversing Pumps, series 8021, 8061 and 8101, maintain unidirectional delivery regardless of direction of shaft rotation on machines and mechanisms that reverse. Pumps are designed for continuous operation, with pressures up to 100 lb. p.s.i. **Browne & Sharpe, Inc.**, Providence, R. I.

19. Power Shears for light gage metal, bulletin 71-1, features compactness, speed, unbreakable steel construction and full visibility of cutting line. Machine cut maximum of 20 gage with mild steel. **Niagara Machine & Tool Works**, 697

Northland Ave., Buffalo 11, N. Y.

20. Catalog B-649 permits quick reference on any standard drill jig bushing or liner. Table of drill sizes and decimal equivalents is provided in the back of the wire bound catalog. **Colonial Bushings, Inc.**, Box 37, Harper Station, Detroit 13, Mich.

21. Plastic, metal, wood, stone and leather sanding and rubbing with National's models 100, 300, 400 and 500. Specifications and nomenclature given on all models, along with operational pictures. **National Air Sander, Inc.**, Rockford, Ill.

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22. Template Controlled roll turning lathe is available in two lengths to accommodate rolls up to 102" or 126", and is capable of turning within these ranges a diverse variety of shapes on the roll face as well as handling necks at the same setup. Monarch Machine Tool Co., Sidney, O.

23. Verson 16-48 press brake does a wide variety of jobs from simple radius forming to multiple bend forming. Folder gives full specifications and uses of machine. Other models of press brakes, gang

punches and presses are illustrated in bulletin 16-48A. Verson Allsteel Press Co., 9300 S. Kenwood Ave., Chicago 19, Ill.

24. Style TM Insert Chaser Die Head cuts taper die threads in such a way that the chasers gradually open as the thread is being cut. This action eliminates marks along the thread. Die head can also be equipped with chamfering and reaming tool for finishing. Bulletin No. 16. Eastern Machine Screw Corp., New Haven 6, Conn.

25. Motor Generator sets are of interest to large industrial plants and laboratories, particularly for production testing of electrical devices requiring special voltages and frequencies. Form 549-MG describes Katolight generators and other products of the company. Kato Engineering Co., 1415 First Ave., Mankato, Minn.

26. Telemetering Systems, bulletin GEA-5233, describes frequency, torque-balance and photoelectric types of equipment used in power distribution and industrial applications. Typical wiring diagrams, dimensions and auxiliary equipment are shown in this 20 page bulletin. General Electric Co., Schenectady, N. Y.

27. The Lever, a Lewis-Shepard publication, is a magazine type discussion on material handling, with the use of various types of trucks for quick and efficient moving of materials. Lewis-



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Shepard Products Inc., 245 Walnut St., Watertown, Mass.

28. Power Dome, non-rotating, double acting air cylinders of Bellows Co., are made in 2, 4, 6 and 8" bores with any stroke length. Eleven mountings, with pictures and diagrams, are shown. Mr. W. C. Richards Jr., Bellows Co., 222 Market St., Akron, O.

29. Ledloy, Ryerson's trade name for leaded, free machining steel is again being marketed. Bulletin describes machinability, advantages and typical screw-machine products of this screw

steel. Joseph T. Ryerson & Son, Inc., Box 8000-A, Chicago 80, Ill.

30. Grain and grade recommendations of abrasive segments for both surface and machine knife grinding operations in Form No. ESA-188. Use, advantages, standard shapes and bonds are also explained for abrasive segments. Simonds Abrasive Co., Tacony & Fraley Sts., Philadelphia 37, Pa.

31. Dry (gas) Cyaniding process for the operation and batch type industrial furnaces is essentially the case hardening of steel in an atmosphere containing carburizing gas with controlled amounts of ammonia. Bulletin SC-145 describes this operation and its advantages. Surface Combustion Corp., Toledo 1, O.

32. "A Century of Progress" is a 40 page, linen bound book outlining 100 years development

in the Austin-Hastings Co. Ample space is devoted to the company's present activities. Listings are given to the company's lines of tubing, sheet metal, tool steel, machine tools, and metal working and welding equipment for which they are distributors. Austin-Hastings Co., Inc., Cambridge, Mass.

33. High Speed Twist Drills & Reamers presents specifications and prices for the Besly line of taper, straight, three and four fluted drills as well as hand and machine chucking reamers. The 48 page catalog is pocket size. Charles H. Besly



& Co., 118 N. Clinton St., Chicago 6, Ill.

**34. Boring and Threading Tool Holders**, with vertical adjustment, are well adapted for taper boring, internal threading and boring of extremely small and deep holes. Round shanks permit turning of tool without re-centering. **Bokum Tool Co.**, Detroit 21, Mich.

**35. Bolster plates** that are made to J. I. C. specifications (except for location of mounting holes and slots) can be ordered for any straight side press. J. I. C. specifications are included with catalog. **Danly Machine Specialties, Inc.**, 2100 S. 52nd Ave., Chicago 50, Ill.

### EUTECTIC CELEBRATES NEW PLANT OPENING

Over 200 guests of Eutectic Welding Alloys Corporation attended the formal opening of the new Eutectic plant in Flushing, New York, on October 7th.

The only plant manufacturing welding rods and electrodes in New York State was fittingly opened by severing a steel ribbon with Eutectic's spectacular Cut-Trode—the new arc metalcutting electrode.

Prof. Otto H. Henry of Polytechnic Institute of Brooklyn was guest speaker, and Rene W. Wasserman, president and founder of Eutectic, described the research and development program which in eight years has entrenched the company as the most progressive name in welding.

The ceremonies were held in the plant's assembly hall, where many of the guests, representing leading industries, were given their first look at the recently announced training school, The Eutectic Welding Institute.

Highlight of the afternoon was a tour of the plant. Guests were shown the Laboratories, foundry, chemical division, EutecticFilm section and the giant high speed extrusion presses of Eutectic's own design.

The responsibilities of **Whiting N. Shepard**, general sales manager of the Plaskon Division of Libbey-Owens-Ford Glass Co., Toledo, have been broadened to include direction of all sales activities of the organization. **Horton Spitzer** has been appointed to a newly created post of director of Eastern Promotional Sales and will re-establish his headquarters in New York.

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**ASHEVILLE, N. C.**  
Tidewater Supply  
Co., Inc.

**ATLANTA 1, GA.**  
Childs, W. P.  
845 Memorial Drive S. E.  
P. O. Box 700

**BIRMINGHAM 2, ALA.**  
Young & Vann Supply Co.  
1725-1731 First Ave.

**BOSTON 16, MASS.**  
Rudel Machinery Co., Inc.  
552 Statler Bldg.

**BUFFALO 7, N. Y.**  
Keller, George Machy, Co.  
1807 Elmwood Ave.

**CHICAGO 6, ILL.**  
Marshall & Huchart  
Machy, Co.  
571 Washington Blvd.

**CINCINNATI 2, OHIO**  
Machy, Co.  
First National  
Bank Bldg.

**CLEVELAND 13, OHIO**  
Mott & Merryweather  
Machy, Co.

**COLUMBIA, S. C.**  
Tidewater Supply Co.

**DAYTON, OHIO**  
Mott & Merryweather  
Machy, Co.

**DETROIT 2, MICH.**  
Cheney, G. H. &  
W. H. Moreton

**INDIANAPOLIS 4, I.**  
Marshall & Huchart  
Machy, Co. of Ind.

**KANSAS CITY, MO.**  
Blackman & Nuetzel  
Machy, Co.

**KNOXVILLE 5, TENN.**  
Murrain, The W. S. Co.  
912 W. Clinch Ave.

**LOS ANGELES 21, C.**  
Henderson-Morgan  
Machy, Co. Ltd.

**2026 Santa Fe Ave.**

**MINNEAPOLIS 1, M.**  
Satterlee Co., The  
118-120 Washington  
Ave., N.

**NEW ORLEANS 6, LA.**  
Dixie Mill Supply Co., Inc.  
901 Tchoupitoulas

**NEW YORK CITY 17**  
Rudel Machinery Co., Inc.  
100 East 42nd St.

**NORFOLK 1, VA.**  
Tidewater Supply  
Co., Inc.

**OMAHA 2, NEB.**  
Cardinal Supply &  
Mfg. Co.

**PHILADELPHIA 3, PA.**  
Swind Machinery Co.  
Broad St. Station Bldg.

**PITTSBURGH 22, PA.**  
Mott & Merryweather  
Machy, Co.

**717 Liberty Ave.**

**ROANOKE, VA.**  
Tidewater Supply Co.

**ROCHESTER 4, N. Y.**  
Keller, George Machy, Co.  
509 Commerce Bldg.

**SAN FRANCISCO 7, C.**  
Jenison Machinery Co.  
20th & Tennessee Sts.

**SEATTLE 4, WASH.**  
Hallidie Machinery Co.  
2726 First Ave., S.

**SHREVEPORT, LA.**  
Dixie Mill Supply  
Co., Inc.

**ST. LOUIS 8, MO.**  
Blackman & Nuetzel  
Machy, Co.

**3713 Washington Blvd.**

**SYRACUSE 2, N. Y.**  
Briggs, C. H. Mach.  
Tool Co. Inc.

**ONONDAGA Hotel Bldg.**

**W. HARTFORD 7, CT.**  
Rudel Machinery Co., Inc.  
7 South Main St.

**ABRASIVE MACHINE TOOL CO.**  
EAST PROVIDENCE 14, R. I.

**ABRASIVE**

ACCURACY BOOSTS PRODUCTION

Learning  
Your  
Clutch  
Needs

Improve Your Product  
**FREE - With**

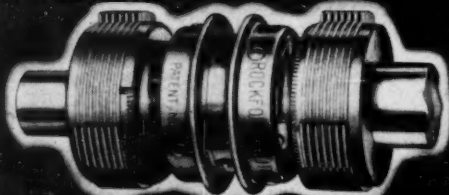
Automotive  
  
and Aircraft

Analysing the  
Problem

**PULLMORE**

Trucks and  
Busses

Designing the  
Clutch



Tractors and  
Road Machines

Planning  
Production

**MULTIPLE-DISC**

Farm Machines  
and Implements

Tooling Up

**ROCKFORD**

Oil Field  
Rigs and Pumps

Manufacturing

**CLUTCHES**

Industrial

Checking and  
Testing

It won't cost you any more to specify the ROCKFORD clutch that is exactly suited to your product's power transmission control requirements—than to try to "get by" with one that only meets some of your needs. With an extensive range of clutch types and sizes to choose from, and a vast amount of experience-data to draw upon, ROCKFORD engineers can help your technical staff improve the power transmission control in your product, without adding to the cost. A request for a ROCKFORD engineered-to-the-job clutch recommendation, for your product, will not incur any obligation.

Mowers  
and Light  
Machines

Supervising  
Installation

Engines and  
Marine  
Units

Servicing

Machine Tools  
Production Units

ENGINEERING  
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CORPORATION

**ROCKFORD CLUTCH DIVISION**

ROCK-WARNER

1309 Eighteenth Street, Rockford, Illinois

ROCKFORD  
CLUTCHES  
POWER  
TAKE-OFFS  




**CURRENT**  
**MOTOR PROBLEMS**  
**ARE SOLVED BEST BY**

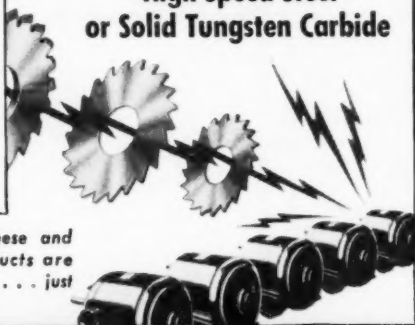
**CIRCLE R SAWS**

**FOR**  
**COMMUTATOR SLOTTING**  
**and Mica Undercutting**

That's right . . . today wherever electric motors for land, air or sea power are made, you'll find CIRCLE R saws at work!

These CIRCLE R Saws are clearance ground to prevent binding.

**"U" and "V" Type**  
**High Speed Steel**  
**or Solid Tungsten Carbide**



Complete listings of these and other CIRCLE R products are available in catalog M . . . just issued!



## **CIRCULAR TOOL CO., INC.**

PROVIDENCE 5, RHODE ISLAND

CHICAGO • CLEVELAND • DAYTON • DETROIT • INDIANAPOLIS  
 LOS ANGELES • MILWAUKEE • MINNEAPOLIS • NEW YORK CITY  
 PHILADELPHIA • PHOENIX • PITTSBURG • PROVIDENCE  
 ROCHESTER • ST. LOUIS • TOLEDO

## Literature Mentioned In This Month's Advertisements

**36. The Rocheleau Universal Cutter Grinding fixture** has a minimum of extra fixtures for speed and ease of setting up and operating. Fixture will hold cutters from the smallest to 8" diameter. **Rocheleau Tool & Die Co.**, 650 N. Main St., Leominster, Mass.

**37. Multi Purpose Machine Vises**, with plain, swivel and centering bases, have holding and bushing attachments. Bulletin 44 also shows an adjustable angle knurl holder for use in lathe turret. **The Graham Mfg. Co., Inc.**, 61 Bridge St., East Greenwich, R. I.

**38. Ram Presses** for internal push broaching, surface broaching, slotting and press work are available in 4, 6 and 10 ton capacities with either 24 or 36 inch stroke. Bulletin No. RP-49. **Colonial Broach Co.**, Detroit 13, Mich.

**39. Standard or Special Dies**, with hardened, ground or lapped leader pins, resist wear. **Danly Machine Specialties Inc.**, 2100 S. 52nd Ave., Chicago 50, Ill.

**40. Traveling Shaper Machines** a surface requiring 8' of table travel in one setup. Accurate settings can be made by operator who rides with machine to operate the controls while in travel. Catalog S-5. **The Cincinnati Shaper Co.**, Cincinnati 25, Ohio.

**41. Air Operated Press** provides pressures up to 75 tons. Free catalog of Dake presses. **Dake Engine Co.**, 608 Seventh St., Grand Haven, Mich.

**42. Heat Treated, High Tensile strength T-bolts** in complete ranges up to 1"x 22". **West Point Mfg. Co.**, 19625 Merriman Ave., Farmington, Mich.

**43. "Quick Change" 10 inch lathe** has capacity and economy for small parts operations. Sixteen speeds, from 28 to 2072 r.p.m., and 54 thread selections save set up time and speed production. **Atlas Press Co.**, 1250 N. Pitcher St., Kalamazoo, Mich.

**44. Wire Mesh Panels** and doors for stock rooms and tool cribs are catalogued showing standard sections. **Acme Wire & Iron Works**, 3519 E. Canfield, Detroit 7, Mich.

**45. Little Shaver** is adaptable to standard tool holders and has standard or special tool and roll. **Brunette Tool Co.**, New Britain, Conn.

**46. Bench Model Boring Machine**, for use in tool rooms, repair and jobbing shops, and experimental departments, has 16 speeds from 20 to 825 r.p.m. **Circular Ml. Conrad Machine Co.**, Lombard, Ill.

**47. A Completely Automatic Drill-pointer machine** grinds points on drills 1/4" to 3" in diameters. Provides variable point angles and clearances on 2, 3 or 4 fluted drills. **Oliver Instrument Co.**, 1408 E. Maumee St., Adrian, Mich.

**48. "Turret Lathe Tools"** explains principles for bar and chucking work, combined and multiple cuts, and applications of modern tooling. Book has 184 pages. **Warner & Swasey**, Dept. 320, Cleveland 3, Ohio.

**49. Infinite Variations** of speeds and adaptations of clutches transmit power from centralized source. Models available, from 1/3 to 300 h.p., are described in bulletin P25. **The Conway Clutch Co.**, 2740 Colerain Ave., Cincinnati 25, Ohio.

**50. A Complete Line** of balancing tools, sensitive but durable, provides means of checking gears, flywheels, etc. Bulletin No. 491 describes line that has capacity range of 12-24,000 lb. **Sundstrand Machine Tool Co.**, 2535 Eleventh St., Rockford, Ill.

**51. Milmaster** is an attachment for conversion of horizontal or vertical millers into universal milling machines. **Bemis & Call Co.**, 130 Main St., Springfield, Mass.

**52. Uniform, Interchangeable Dies,** punches and their retainers can be used repeatedly. When worn, they can be reground into new shapes. Forty-eight page catalog. **Allied Products Corp.,** Dept. 38, 12621 Burt Road, Detroit, Mich.

**53. Air Traps,** for elimination of blow-through, have a large orifice to prevent dirt and scale accumulation. A water trap is used in leakproof seal. Catalog 448 describes three types. **W. H. Nicholson & Co.,** 117 Oregon St., Wilkes-Barre, Pa.

**54. Model 75 Hobbing Machine** has automatic radial and longitudinal feed which results in shortened approach stroke for increased production. For gear diameters from .07874 to 3.46456. **Lambert Div., Hauser Machine Tool Corp.,** Manhasset, N. Y.

**55. By-Pass,** oil relief valves help maintain constant pressure. Valves built in oil spray systems. Described, along with coolant pumps, in **Fulflo Mechanical Data Book. Fulflo Specialties Co., Inc.,** Blanchester, Ohio.

How to select and use the right file for the job is the substance of a talk by **Walter R. Buerckel, of Nicholson File Co.,** Providence, R. I. This lecture, illustrated by slides, has been successful in increasing efficiency in filing in many of the largest industrial

plants. Simple enough for trainees to understand. Also technical enough to interest and help experienced foremen and machinists. Schedules now being made up for winter season. Write for full details. There is no charge for Mr. Buerckel's services.

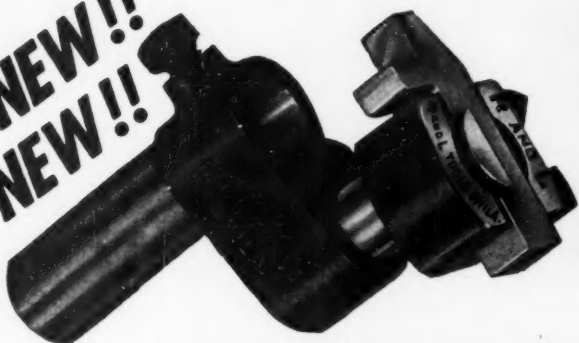


TOM  
HENDERSON

"Two rather persistent gentlemen  
are at the door to see you, sir"

TOM HENDERSON

**NEW!!  
NEW!!**



**R AND L  
TURRET  
BACK REST  
HOLDER**

For use on R and L Turning Tools.  
Simple design allows for convenient  
interchanging of the R and L car-  
bide surfaced or Roller Backrest  
(above) and the R and L Burnish-  
ing Backrest shown below. Built in  
sizes to fit all R and L Turning Tools.

•  
**R and L Tools Changed in Ten  
Seconds for Right or Left Hand  
Turning.**

•  
**Manufacturers of Precision Tools  
for Screw Machines.**

•  
**Also Turning Tools . . . Roller  
Backrests . . . Carbide Backrests  
. . . Tap and Die Holders . . .  
Universal Tool Posts.**



*This*  
**TURNING  
TOOL...  
Replaces  
14 TOOLS**

Can be changed from  
**RIGHT to LEFT**  
. . . in 10 Seconds

**Write for Literature**

**R AND L TOOLS**

**1825 BRISTOL ST., NICETOWN, PHILADELPHIA 40, PA.**



**NOW YOU  
CAN HAVE...**



**An Economically priced AUTOMATIC  
BAR FEEDER for your Band Saw —  
the Wells-O-Bar FEED MASTER**

Owners of Wells No. 8 and No. 12 Machines or other horizontal metal cutting band saws can now convert these units into fully automatic bar stock cut-off machines at very modest cost. The new Wells-O-Bar Feed Master accurately feeds bar stock in a variety of shapes and sizes

into the machine and automatically controls the saw frame through each cutting and resetting cycle. Requires only 60 to 80 pounds air pressure. Safety features eliminate necessity of constant attention. Write for details and prices.



*Products by Wells are Practical*

**METAL CUTTING  
BAND SAWS**

WELLS MANUFACTURING CORPORATION  
707 COOLIDGE AVE., THREE RIVERS, MICH.

*New Books*

**MANUAL OF DIE-HEAD THREAD CUTTING**

By H. Schlarman. Published by McGraw-Hill Book Co., New York. 1949. First Edition. 266 pages. \$3.50.

Many thread-tool men should find this manual a new aid in solving die-head threading problems. The author, with 17 years of experience in this field, states that he does not expect the manual to take the place of experience, but he does hope that it will help dispel carelessness

and guesswork on threading jobs.

The first four chapters are used in preliminary discussion of equipment and methods, unusual die-head adaptations, types of die-heads and chasers, and die-head troubles and maintenance. The following nine chapters become more specific and take up such procedures and facts as: Chaser Facts; Sharpening of the Radial Chaser; Sharpening of the Tangent Chaser; Sharpening of the Circular Chaser; Chaser Usage; Gaging External Threads; Thread Troubles; Thread Samples and Analysis; The Draftsman and the Thread.

The remainder of the book is devoted to 65 pages of tables, charts, and die-head formulas. This includes tables of sines and tangents; length of chamfer chart; taper pipe threads; wire sizes; fits; flank-angle correction factors, and other useful material.

**RUNNING A MACHINE SHOP**

By Fred H. Colvin, Editor Emeritus of "American Machinist", and Frank A. Stanley, Editor of "Western Machinery And Steel World". Published by McGraw-Hill Book Co., New York. 1948. Second Edition.

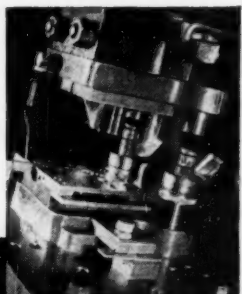
In the second edition of this book, the authors have supplemented their original writings with new ideas of machine shop practice developed just before and during the war. Chapter One is an over all glimpse of what comprises the operation of a machine shop. This includes the factors of machines, material, layout, production, cost analysis, etc.

After the initial chapter, each factor is more fully discussed in the following order: Planning a Shop; Shop Equipment; Shop Transport and Materials Handling; Toolrooms and Tool Cribs; Work in the Shop; Estimating; Apprenticeship and Training; Management; Foremen and Personnel Relations; and Inspection Systems. Many of these procedures have been found to be most satisfactory in recent years. Basically, they are the more established methods of determining the factors which affect policies within the machine shop.

In the last of the book, the supplement, the authors take up the more recently developed ideas found in job evaluation, cost training, job rotation, rate setting, estimating production time, etc. The later developments in machining operations are also included here, such as milling, honing, boring, broaching, and small motor selection guide.

# NOW!

## Positive Lubrication for Leader Pins and Bushings



Acro leader pin oilers shown in position on press in illustration above. Left close-up of Acro leader pins attached to die shoe.

## Eliminate Wear and Maintain Accuracy In Dies with ACRO Pin Oilers

Put these oilers on all your presses and forget lubrication troubles. Regardless of press speed, Acro Pin Oilers provide a constant cushion of oil between pin and bushing. Oil is transmitted to pins by capillary attraction on each upward stroke of press. Hand oiling is eliminated, die life prolonged, production increased.

Acro Pin Oilers slip over leader pins, are easily adjusted to proper height and tightened. After filling, no other adjustment is necessary, except refilling. Especially adaptable for Hi-speed long runs. A reservoir of oil for long time constant "every-stroke-lubrication" will definitely provide maximum pin and bushing accuracy that will result in longer die life, avoid costly repairs and loss of production.

Attention Dealers: Some Territories Available.

### FREE! MORE FACTS

Get the complete details on this new fool-proof method of leader pin lubrication. Write for bulletin B89.



**ACRO METAL STAMPING COMPANY**  
332 E. RESERVOIR AVE. • MILWAUKEE 12, WIS.

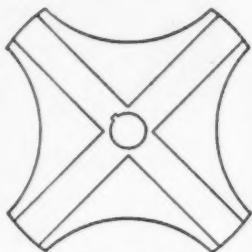
## WELD DESIGN

By Harry D. Churchill, Professor of Engineering Mechanics, Case Institute of Technology, and John B. Austin, welding engineer, Republic Structural Iron Works. Published by Prentice-Hall, Inc., New York. First Edition, 1949, 216 pages. \$6.65.

This book fills a need for information on the welded machine-base design. The authors state that while many engineers are aware of the advances made in arc welding, in many cases they have not been able to proceed because of a lack of knowledge of welding design experience and information. With this conclu-

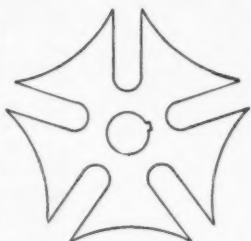
sion as a base, the authors have treated the subject from both a theoretical and practical standpoint.

After chapter 1, which is an introduction to the terms used, the book takes up the subject of: Construction Materials of Machine Bases; Stress Analysis and Design Data; Designing Arc Welded Machine Bases; Application of Welded Design Principles; Welding Specifications; Weldery Procedure; Welding Processes; Flame Cutting and Flame Hardening; Forming of Metals; and Estimating Welded Machine-Base Costs. Further stress design data is given in Appendix I.



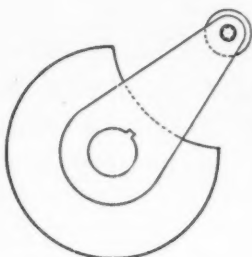
Four Point

The Geneva Drive will give a positive but intermittent motion to the driven wheel but prevents its moving in either direction without the driver.



Five Point

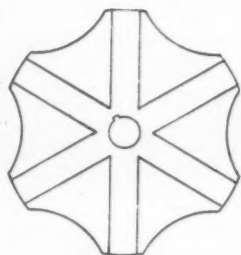
Install a Geneva Drive for positive precision indexing at higher speed.



Driver

A geared Geneva Drive will produce a reciprocating motion with a minimum of vibration at higher speed than any other method.

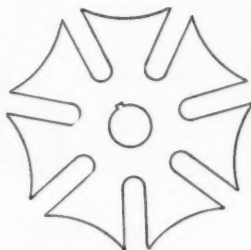
Send us your problems for free estimates.



Six Point

Four to eight point Geneva Drives now being manufactured as stock items having center distances of:

3"	3 1/4"	3 1/2"	3 3/4"
4	4 1/4	4 1/2	4 3/4
5	5 1/4	5 1/2	5 3/4



Seven Point

For particulars write

**GENEVA MACHINE & TOOL COMPANY**

**P. O. BOX 76 • HANOVER, PA.**

# News of the industry . . . . .

## INDEX OF NEW ORDERS AND SHIPMENTS OF MACHINE TOOLS

Base—Average Shipments 1945-1946-1947=100 %

Date	New Orders (Total)	Foreign Orders (Included in Total)	Orders (Total)	Shipments (3 Mo. Average) (Centered)	Ratio: Unfilled Orders to Shipments (As Reported)
<b>1948</b>					
Jan.	83.1	14.0	75.3	86.9	5.4—1
Feb.	77.3	12.7	87.1	82.0	4.7—1
Mar.	86.3	16.1	83.6	84.2	4.6—1
Apr.	86.3	14.1	82.0	82.7	4.7—1
May	73.5	11.4	82.6	86.3	4.5—1
June	83.4	11.9	94.4	79.8	3.8—1
July	74.0	13.3	62.4	75.5	5.9—1
Aug.	73.7	13.6	69.8	72.3	5.2—1
Sept.	73.1	11.6	84.7	78.3	4.2—1
Oct.	67.4	14.0	80.4	80.4	4.2—1
Nov.	72.2	18.1	76.2	84.5	4.4—1
Dec.	76.7	16.2	96.9	80.6	3.2—1
<b>1949</b>					
Jan.	87.0	21.9	68.8	78.7	4.6—1
Feb.	80.9	26.5	70.3	71.6	4.7—1
Mar.	93.5	22.3	75.8	73.6	4.4—1
Apr.	70.1	23.1	74.7	74.4	4.4—1
May	63.7	15.8	72.8	75.5	4.4—1
June	53.6	15.7	79.0	70.8	3.5—1
July	48.0	14.0	60.7	69.0	4.4—1
Aug.	51.5	18.8	67.3	p 65.2	3.8—1
Sept.	p 57.7	p 13.7	p 67.6		p 3.7—1

p - Preliminary figures

### NATIONAL METAL CONGRESS AND EXPOSITION

A record number of visitors to the Public Auditorium in Cleveland participated in the 31st National Metal Congress and Exposition, October 17 through 21. Sponsored by the AWS, ASM, AIME and SNTD societies, over 360 exhibitors demonstrated their contributions to the theme

"Production Economies". Several hundred speeches and papers were presented along this line of thought.

The majority of exhibits dealt with machinery, heat treating, welding equipment, tools, control instruments and accessories. A few of the numerous contributing companies are listed with the products they exhibited. Wilson Mechanical Instrument Co. gave demonstra-

tions in the testing hardness of fine wires, odd shapes, bulky items, internal surfaces, etc., with their line of equipment. Sun Oil Co. exhibited a combination cutting and lubricating oil which eliminates the need for oil dilution. There are two grades, Sunicut 812W and 817W.

Tomkins-Johnson displayed hydraulic control cylinders of various powers on equipment, such as the Wagner Malleable Nut Production machine. Precision lapping machines, with adjustable lapping plate and automatic cycling, were demonstrated by Crane Packing Co. The plate sizes ranged from 12 to 72 inches.

Lukens Steel Co., By-Products Steel Division, displayed pressed, blocked, sheared and welded shapes as examples of the various types of work they supply to customers. Worthington Pump and Machinery Corp., Ransome Division, presented a turn-roll positioner for holding round objects, such as tanks, or large diameters or great weights.

Two fluid bath mixtures for heat treating were demonstrated by the American Cyanamid Co. The trade names of the mixtures were Aeroheat and Aerocarb. Cincinnati Milling Machine Co. operated an automatic flame hardening machine

capable of continuous heating cycles for high production.

The elimination of problems found in the welding of aluminum bronze and stainless steel was demonstrated by the Airromatic process of the Air Reduction Sales Co. The methods employ inert gas. Hammond Machinery Builders displayed models of a new grinder, polisher and buffer with increased indexing speeds and pneumatic head lifters.

Wells Manufacturing Co. exhibited a portable pneumatic band saw for metal cutting. The saw has automatic feed. A welder using dry disc rectifiers and 3 phase reactors, in three models, was shown by Westinghouse Electric Co. American Chain & Cable, Campbell Division, exhibited an abrasive cutting machine for wet or dry operation.

A shaker hearth furnace with no moving parts in the heating compartment was displayed and operated by Hevi-Duty Electric Co. The furnace can be used for dry cyaniding and bright hardening and carburizing. Kentanium, an amazing titanium composition of Kennametal Inc., has the properties of strength, abrasion resistance and non-distortion in high heats.

**TELL US**

*Your Problems!*

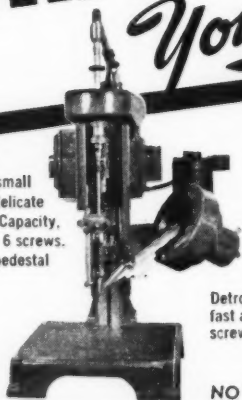
**SEND  
SAMPLES  
FOR FREE  
ESTIMATES  
NOW!**

*We have a*

**DETROIT POWER SCREWDRIVER**  
*to Fit Your Needs*

**MODEL A**  
For driving small  
screws in delicate  
assemblies. Capacity,  
No. 2 to No. 6 screws.  
Bench and pedestal  
types.

**ALSO 2  
OTHER  
MODELS**



Let us show you how this modern machine will greatly speed your assembly work, raise production and cut costs . . . Hopper-fed Detroit Power Screwdrivers will drive all types of screws at amazing speed, as fast as one a second . . . Think what a tremendous time and labor saver! . . . All screws driven to uniform tension . . . No marring of heads or stripping threads.

*Let's get started Now for 1950*

**NO WAITING, NO DELAY...Delivery within 10 days on certain models**

**DETROIT POWER SCREWDRIVER CO.**

**2809 W. FORT ST.  
DETROIT 16, MICH.**

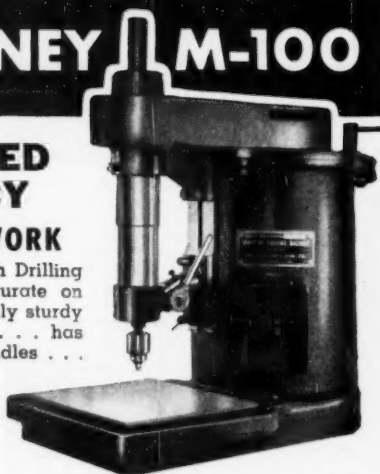
# SIGOURNEY M-100

## MAINTAINED ACCURACY

### IN PRECISION WORK

The Sigourney M-100 Bench Drilling Machine is extremely accurate on precision jobs. It is unusually sturdy and rigid in construction . . . has hardened and ground spindles . . . and sealed ball bearings throughout. All moving parts are entirely closed for maximum operator safety. M-100 is built for long and steady service.

This sturdily constructed bench drilling machine is available in 1, 2, 3 and 4 spindle models . . . speeds from 4,000 to 10,000 r.p.m.



Send for illustrated bulletin

**THE SIGOURNEY TOOL CO.**  
Hartford 6, Conn.



Sole Sales Agents

**PRATT & WHITNEY**

Division Niles - Bement - Pond Co.

West Hartford, Connecticut

Cincinnati Lathe & Tool Co. has acquired the well-known line of Canedy-Otto Light Upright, Sensitive and Radial Drills.

All operations, engineering, manufacturing and sales, will be transferred from Chicago Heights to Oakley, Cincinnati, and production will be resumed at the earliest possible moment, according to an announcement by Mr. Millard Romaine, president of Cincinnati Lathe & Tool Co.

Plans for moving the general offices of Pressed Steel Car Company, Inc., to

the field of production.

The acquisition of Union Machinery Co., of Joliet, Ill., by American Machine and Foundry Co., was announced today by Morehead Patterson, AMF's board chairman.

Union Machinery is one of the country's leading manufacturers of bakery equipment. Its products include bread-dough dividers, rounder proofers, hoppers and dough chutes. It also manufactures an automatic roll divider and rounder.

The Baldwin Locomotive Works, Phil-

Chicago from Pittsburgh were announced yesterday by the company. All departments now in the Koppers Building in Pittsburgh will be moved to Chicago, but the company will maintain a sales office in Pittsburgh.

It was stated that from the experience gained by that move it was felt that still greater efficiency could be realized by moving other office departments to Chicago since that city is most centrally located in relation to the company's three plants and to its customers.

It was recently announced that Mr. George Gorton III, executive vice-president and general manager of the George Gorton Machine Co., has accepted membership on the American Management Association Production Council.

This Council is composed of men selected from the membership to guide the Association's activities in



# Chicago DIE CASTINGS

AVAILABLE from STOCK  
for IMMEDIATE SHIPMENT

"V" Pulleys



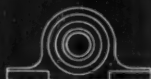
"Step" Pulleys



"Multiple" Pulleys



"Variable" Pulleys



"Ball Bearing" Pillow Blocks



"Bronze Bearing" Pillow Blocks



"Babbitt Bearing" Pillow Blocks



"Babbitt" Journal Bearings

**Yes!**—all items illustrated on this page, and many other items not illustrated, are Standard Stock ready for immediate shipment to you. **YOU SAVE—TIME . . . MONEY . . .** when you use Chicago Stock Parts. No dies to build . . . No stock to carry.

For complete information write for catalog No. 50A



Shaft Collars



Flexible Couplings



Miter Gears



Hand Wheels



Manufactured by  
**Chicago DIE CASTING MFG. CO.**

2515-17 West Monroe Street  
Chicago 12, Illinois



**Marshall Steel Co.,** formerly of Lisle, Ill., has moved to its new building in McCook, Ill., just outside of Chicago. This expansion was necessary to increase the present facilities and provide a broader service throughout the entire country.

A large group of Mattison Grinders enables them to produce ground flat tool steel of three kinds: water quenched, oil quenched, and air quenched, better known to the trade as Watercrat, Oilcrat, and Aircrat.

Announcement is made of the acquisition of the controlling interest of the 82 year old **Ottumwa Iron Works,** Ottumwa, Iowa, by Lou Mervis, industrialist and present head of the Pittsburgh Gear Company of Pittsburgh, Pa. Mr. Mervis becomes president of this pioneer manufacturer of speed reducers, sykes-herringbone gears, hoists and other products for mines, steel mills and other industrial plants. Other new officers for the Ottumwa concern include: E. R. Phillips, vice president in charge of sales, Francis Knuth, vice president, Myra Mervis, treasurer, and John Thurlow, secretary.

**Firth Sterling Steel & Carbide Corp.,** announced price cuts averaging 10% on Firthite (Tungsten Carbide) Tips and Blanks effective October 5, 1949. Firth Sterling also introduced new package lot prices and additional discounts on package quantities of Tips and carbide-tipped

Philadelphia, Pa., announced that it has bought the press business of Defiance Machine Works, Inc., Defiance, Ohio, effective as of October 5. The purchase includes all models of Defiance preform presses, which will now be manufactured under the Baldwin-Defiance name at the Baldwin Eddystone, Pa., plant. Original drawings, other engineering data, and accessories for specialized applications are included in the transaction. These presses will be sold through the Baldwin District Sales Offices.



"Prof. Glugg has a theory that if he isolates everything but the common cold germ, what's left has got to be it"

GARDNER REA

#### General Purpose Tools.

A price reduction of 10% on all standard blanks in package quantities, has been announced by Carboloy Co., Inc., Detroit Mich. This reduction follows price reductions made in June on standard single point lathe and roller turner tools.

In addition to the flat 10% reduction now being made on blanks, there is also a new quantity discount of 5% on individual orders for 5 to 9 identical packages of standard tools and blanks in package quantities for immediate delivery. This

quantity discount applies to both stocked and non-stocked grades. On 10 or more standard packages, the discount is 10% off list price. In addition, non-stocked grades of standard tools and blanks in lots of 5 or more packages will—under the new pricing system—be available at the same price as the stocked grade items.

The L. R. Kerns Co., of Chicago, manufacturer of industrial lubricants announces that effective October 1st, Mr. L. R. Kerns will no longer be associated with the Company. Mr. L. R. Kerns' interest has been purchased by a group of the employees. All present representatives and employees will be retained.

The new officers will be: B. L. Smalley, president; S. F. Gordon, vice president; D. E. Fredericks, vice president; M. H. Schellenberg, secy.-treasurer. There will be

no changes in Company policies. The name, L. R. Kerns Co., will be retained.

#### GRAHAM MANUFACTURING CO. UNDER NEW MANAGEMENT

Graham Manufacturing Company, East Greenwich, R. I., has undergone a recent change in management. The firm was previously owned by J. C. B. Washburn. New officers include Richmond Viall, Jr., president and treasurer, and Fred R. Budlong, secretary and assistant treasurer. The transfer took place on September 12, 1949.

### MORRIS BLUMENTHAL 1891-1949

Morris Blumenthal, a partner in the Centre Machinery Co., 249 Centre St., New York 3, N. Y., died suddenly of a stroke on October 16, 1949. Mr. Blumenthal had been associated with the firm since its founding, approximately 17 years ago. He was previously affiliated with A. Lemberg, and had a wide acquaintance throughout the machinery business for over 35 years.

Mr. Blumenthal was born in Manchester, England, in March 1891, and came to the United States in July 1904. He is survived by his wife, four children and seven grandchildren. He resided at 1164 E. 10th St., Brooklyn, N. Y.

### ACME STEEL CHAIRMAN DIES

Charles S. Traer, chairman of the board of Acme Steel Company, Chicago, died suddenly on October 5, 1949, of a heart attack. Mr. Traer had just completed 30 years of active service with the Acme Steel Co., having started with them as works manager in 1919. He subsequently served as treasurer and works manager from 1922-1935, vice president and manager of production, 1935-1941, and president, 1941-1948. He had been chairman of the board since 1948.

Mr. Traer was born in Chicago on November 24, 1890; he was a graduate of Yale University of the class of 1910. During World War I, he served as a captain in the U. S. Army. He was a member of the Chicago Club and South Shore Country Club. He is survived by his widow, two daughters, a sister and a brother.

### WALTER P. BELL, I-R VICE PRESIDENT, DIES

Walter P. Bell, vice president and general sales manager of Ingersoll-Rand Company, 11 Broadway, New York, died recently at his home in New York. His age was 48.

Mr. Bell joined Ingersoll-Rand in 1923; he was manager of sales in New England before coming to the New York office as a vice president. He was a member of the Engineers' Club of New York, the Tennis and Racquet Club of Boston, and the Corinthian and Eastern Yacht Clubs of Marblehead, Mass.

Surviving are his wife and a brother, William E. Bell.

The G. A. Gray Company, Cincinnati, Ohio, announces the appointment of C. F. Bulotti Machinery Co., San Francisco 7, Calif., as exclusive distributor for the Gray line in Northern California.

## M-T

# FIXTURE CLAMPS

### AND COMPONENTS



**BE DOUBLY  
SURE with  
M-T QUALITY**






- **FIXTURE CLAMPS** — wide range of sizes and types to fit every requirement.
- Jack Locks . . . . . Cam
- Locks . . . . . Hand Knobs . . . . . Steel
- Ball Handles . . . . . Soft
- Chuck Jaw Blanks . . . . .
- Fixture Cams . . . . . Alloy
- Set-up Studs . . . . . Rest
- Buttons and Rest Pads . . . . .
- . . . Spherical and Plain
- Collar Nuts . . . . . Quarter
- Turn Screws . . . . . Fixture
- Keys . . . . . Spherical and
- Flat Washers . . . . . Shoulder
- Screws and many other items from stock.

## MORTON MACHINE WORKS

2422 Wolcott St.,  
Write for Complete
Detroit 20, Mich.  
Catalog.

### HIGH SPEED SLAB MILLING CUTTERS

2 1/2" dia. x 6" width x 1" arbor	
Original cost	\$35.00
Our price	\$12.00
In lots of two	\$11.00 ea.
In lots of six	\$10.00 ea.

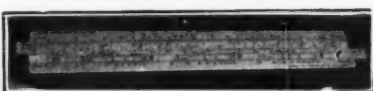
Unused in original factory carton.

### MOLY HIGH SPEED DRILLS (unused)

1/4" with No. 1 MT.	\$0.45
27/64" with No. 1 MT.	\$0.50
31/64" with No. 1 MT.	\$0.65

10% discount in dozen lots

**T & T TOOL 101 W. Archer Tulsa, Okla.**



### WAKCO WEIGHT RULE

enables you to calculate almost instantly the weight of a piece of metal in any size or shape. Covers aluminum, brass, cast iron, copper, lead, magnesium and steel, in balls, bars, cubes, fillets, hexagonal, octagonal, plates, prisms, pyramids, 1/4 round, 1/2 round, round, wedges, etc. Rule made with all-white plastic with markings protected by overlamination of clear plastic. RULE in case with Instruction Manual . . . . . \$13.50

### WARREN-KNIGHT CO.

134 1/2 N. 12th St., Phila. 7, Pa.

## Appointments & Promotions

Frank J. Aschenbrenner and Earl C. Clark have been appointed assistant directors of research and engineering of Air Reduction Sales Co., New York, according to an announcement made by Dr. George V. Slottman, Air Reduction director of research and engineering.

Several changes in the Eastern Sales Division of E. F. Houghton & Co., Philadelphia, have been announced by D. J. Richards, vice president of sales. The division has been split into two sections: Eastern Sales North, which will include New England and New York State, and Eastern Sales South, including Pennsylvania, New Jersey and Delaware. Orum R. Kerst will head the north section, and J. R. Clendenning will take over the south. A. C. Smith, former assistant to

the eastern sales manager, was promoted to the newly created post of sales coordinator for the two eastern sections.

A. Charles Amann has been appointed industrial sales manager of the Stamford Division of The Yale & Towne Manufacturing Co., it was announced by Meade Johnson, general sales manager.



A. Charles Amann



T. W. Gabriel

Firth Sterling Steel & Carbide Corporation, McKeesport, Pa., announces the appointment of T. W. Gabriel as general sales manager.

## SELECT THE BEST... Balancing Tool for Your Work from Sundstrand's Complete Line

Here's a complete line of Balancing Tools which will save their cost quickly on balancing or truing operations. Accurately sensitive and durable, they provide a simple, reliable means for checking the balance of parts like gears, shafts, fly wheels, pulleys, etc. The standard sizes available are shown in capacity chart at right.

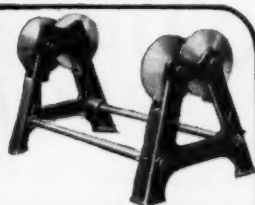


### FREE ADDITIONAL DATA

You can obtain complete information on Sundstrand Balancing Tools by writing for bulletin No. 491



**SUNDSTRAND**  
**MACHINE TOOL COMPANY**  
2535 Eleventh St. Rockford, Ill., U.S.A.



### CAPACITIES

Swing	Between Standards	Weight Capacity
21 in.	20 in.	12 lbs.
21 in.	20 in.	800 lbs.
43 in.	29 in.	800 lbs.
43 in.	29 in.	2,000 lbs.
6 ft.	5 ft.	5,000 lbs.
8 ft.	8 ft.	10,000 lbs.
Any	Any	24,000 lbs.
43 in.	30 in.	800 lbs.

**Frederick A. Fielder** has been appointed general manager of the Bar-Way Co., of Stamford, Conn., manufacturers of high pressure, streamline hose couplings.

**Dr. C. K. Banks** has been named Director of Research of the Metal & Thermit Corporation, New York.



**Dr. C. K. Banks**

**Curtis D. Cummings**

The Allison Company, Bridgeport, Conn., announce the appointment of **Curtis D. Cummings** as sales manager.

The appointments of **Richard H. Diesel** as production manager and of **Frank S. Haniewich** as assistant production man-

ager of the Stamford Division of the Yale & Towne Manufacturing Co. were made public by vice president **Otto G. Schwenk**, acting general manager of the Division.

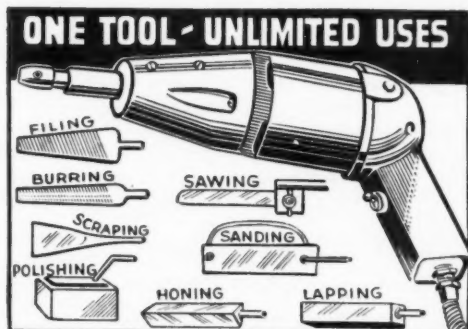
The Baker Industrial Truck Division of The Baker-Raulang Co., Cleveland, announces the appointment of **Edgar E. George** as district sales representative with headquarters in High Point, N. C. Associated with him is **James H. Rigby** who has extensive experience as methods engineer.

Wells Manufacturing Corp., Three Rivers, Mich., announces the appointment of **Martin J. Verhuel** as chief product engineer, Meat Saw Division; **Erwin Tohler**, chief product engineer, Metal Saw Division, and **David T. Evans** as research engineer for both divisions.

Appointment of **Daniel F. Hulgrave** as director of the procurement and schedules section of General Motors Corp., Detroit, was announced recently by **C. E. Wilson**, president. He succeeds **Roger M. Kyes**, who has been named assistant general manager of the GMC Truck & Coach Division at Pontiac, Mich.

## CUT PRODUCTION TIME!

Use these Handy PORTABLE, ELECTRIC RECIPROCATING TOOLS for Greater Production, Better, More Uniform Work — All with less Operator Fatigue. Fixed strokes are  $\frac{1}{8}$ " or  $\frac{3}{8}$ " long. Operate on 110 Volts AC-DC. Deliver 1000 PUSH-PULL strokes per minute. Try one of these tools on your next job.



Send For Descriptive Literature

**ACME TOOL COMPANY**  
71 WEST BROADWAY NEW YORK 7, N. Y.

Optimus Equipment Company, Matawan, N. J., announced the appointment of **Melville Morris** as president.

**Dr. Charles M. Slack** has been named technical director of the Westinghouse Electric Corporation's Atomic Power Division.

**R. C. Ingersoll**, president of Ingersoll Steel Division, Borg-Warner Corporation, Chicago, announced the appointment of **Frank J. Nugent** as sales manager of heating equipment, with headquarters in Kalamazoo, Mich.

The promotion of **Walter J. Herbut** to the post of chief tool designer of the Auto-Diesel Piston Ring Co., Cleveland, has been announced by **R. D. Smith**, vice president and general manager.

Detroit Broach Company announces the appointment of **Earl W. Keir**, Milwaukee, as representative for the southern half of Wisconsin. **Earl J. Golz**, who is associated with Keir will also be serving Detroit Broach customers in the territory.

**Spencer K. Butterworth** has joined the metal department of Bache & Co., members New York Stock Exchange, it was announced.

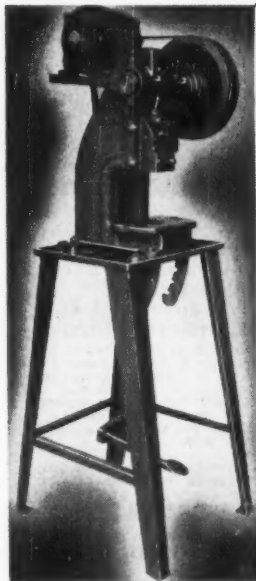
**Major General John Hilldring** (U. S. Army, ret.) has been elected a director of Pressed Steel Car Co., Inc., New York, **John I. Snyder Jr.**, chairman of the board and president, announced.

**James H. Cassell, Jr.**, has been named director of public relations of Pressed Steel Car Company, Inc., New York, it was announced recently.

**Clayton P. (Bill) Yoder** has been appointed sales manager of the Platecoil Division of the Kold-Hold Manufacturing Company according to an announcement by **J. R. Tranter**, president.

**Ray H. Timmons** has recently been appointed manufacturing manager of industrial products for the Westinghouse Electric Corporation, Pittsburgh.

**J. A. Hill**, president of Air Reduction Co., Inc., New York, announced the appointment of **H. R. Salisbury** as president of Air Reduction Sales Company.



## PERKINS JR...

### INCLINABLE PRESS

complete with motor & cord—ready to run

**\$160.00**

**Built with Accuracy for Precision Work.**

The Junior press can also be furnished with deeper throats higher die space and longer strokes.

Immediate delivery on standard Models. Prompt delivery on presses with special frames.

Junior Model E with back flywheel available at price of \$160.00 with motor ready to run. Immediate delivery.

We manufacture presses up to 30,000 lbs. in weight.



**Standard Junior Inclined Press  
Press Builders for 50 Years.**

**PERKINS MACHINE CO.**  
WARREN, MASSACHUSETTS



William Warren Davis has been appointed to the Electronics Division of the National Bureau of Standards, where he will do research on the high speed electrostatic memory of the electronic digital computing machines.

Milton T. Carleton has been appointed works manager of The Cleveland Crane & Engineering Co., Wickliffe, Ohio.



Milton T. Carleton



John F. Miller

Jim Holland will take over the sales manager's post with Camcar Screw & Mfg. Corp., Rockford, Ill.



Jim Holland



James L. Byrom

Frederick U. Conard, president and general manager of Niles-Bement-Pond Co., West Hartford, Conn., recently announced the election of James L. Byrom as a vice president.

Harold Byron Smith, president of Illinois Tool Works, Chicago, has announced the appointment of John F. Miller as manager of the company's Tool Division.

Buffalo Pumps, Inc., Buffalo, N. Y. announces the election of Henry D. Wilson and Bruce W. Ellis to the board of directors of the company.



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OR TAPPING MACHINE**

**THE LUBRI KING**

THE LUBRI-KING UNIT is sturdily constructed with a minimum of moving parts to assure you of trouble free performance. No maintenance costs. No operating costs. Attractively designed. THE LUBRI-KING UNIT puts the lubricant where you need it, when you need it and as much or little as you need. No waste of coolant by constant flow when the

**The  
Lubri  
King  
UNIT**

- ★ SAVES TIME
- ★ CUTS DOWN TOOL COST
- ★ BOOSTS PRODUCTION

tool or drill is not cutting. Pressure on the foot pedal causes the lubricant or coolant to be applied instantly to the work—no need to go looking for an oil can—no need of messy hands from handling one. Use both of your hands to work with.

Capacity, Approx. 2 Gallons.  
Shipping Wt. Approx. 8 Lbs.

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Are Available  
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HAZEL PARK, MICH.**

## Dealers & Distributors

The following have been appointed exclusive representatives for Hydro-Line Air and Hydraulic Cylinders and Special Machinery: **Hydraulic Service Co.**, 7550 Mayland St., Philadelphia, Pa., for the Philadelphia area; and **Alton J. Fabrey**, Scotia, N. Y., for the Western New York territory.

The G. A. Gray Company, Cincinnati, Ohio, has announced the appointment of the following firms as exclusive distributors for their entire line of machine tools: **The Ford Machinery Co.**, Toledo 2, Ohio, for northwestern Ohio; **Frank T. Goetz Machinery Inc.**, NBC Bldg., Cleveland 14, Ohio, for northeastern Ohio; **Martin Supply Co.**, Tulsa 1, Okla., for the State of Oklahoma; and **Hoffman &**

**Heartt**, Los Angeles 21, Calif., for southern California.

**Ferracute Machine Co.**, Bridgeton, N. J., announces the appointment of **C. R. Terry Machinery Co.**, 808 Hanna Building, Cleveland, Ohio, as agent in northeastern Ohio.

The Butterfield Division of Union Twist Drill Co., Derby Line, Vt., has appointed **Bond Supply Co.**, as distributor in Kalamazoo and Battle Creek, Mich.

**Detroit Broach Company** announces the appointment of **Miller-Barber Associates**, New Rochelle, N. Y., as representatives in lower New York State, northern New Jersey, and all of Connecticut, except Hartford County.

**B. C. Ames Co.**, Waltham, Mass., has appointed **E. L. Sandberg Company**, Minneapolis 2, Minn., as exclusive sales representative in the state of Minnesota and western Wisconsin.

The Carlyle Johnson Machine Co., Manchester, Conn., has appointed **Bourke & Mabey**, Toronto 1, Ontario, as sales representatives for all of Ontario.

## AIR QUICK DRILL JIG

**For  
Increased Production**

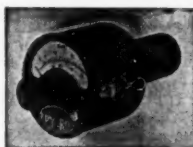
**WRITE  
For Information**



**METAL ITEMS**

**820 SIXTH STREET, RACINE, WISCONSIN**

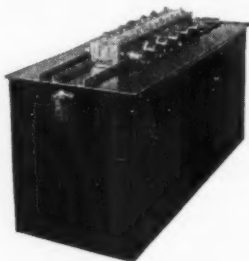
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Determines spot temperatures of heat-treating furnaces, fire boxes, kilns and forgings accurately—instantly. No thermocouples, lead wires or accessories needed. Temperature is recorded on direct-reading dial at press of button. Two double ranges. Write for FREE Cat. No. 100.

**The PYROMETER INSTRUMENT Co.**  
New Plant and Lab., Bergenfield 3, N. J.

## ROLL FORMING MACHINES AND ROLLER DIES



Also Pittsburgh Lock Machines, Pipe and Elbow, Beading, Turning Machines and all other Sheet Metal Working Machinery—

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## 30% LOWER PRICES ON STANDARD TOOLS TIPPED WITH CARBOLOY, VASCOLOY, CARMET, FIRTH-STERLING AND OTHERS

DIRECT FROM FACTORY sales policy permits unusual savings without sacrifice of quality, size or performance of carbide or steel.

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$1\frac{1}{2} \times 1\frac{1}{2} \times 3\frac{1}{2}$ " Standard Tool, CARBOLOY TIPPED, from other sources, lists at \$1.28 at less than package lots. OUR PRICE, EQUAL QUALITY, 30% LESS! This applies on 1 or 1000 tools. Normal transportation allowed.

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ORDER TODAY . . . OR WRITE FOR OUR COMPLETE PRICE SCHEDULE

Semi-Standard and Special Tools to Order

**CORUNDUM COMPANY, INC.**

1773 East 87th Street, Cleveland 6, Ohio

B. C. Ames Co., Waltham, Mass., has appointed **Hal W. Reynolds Co.**, 2902 Euclid Ave., Cleveland, Ohio, as exclusive sales representatives in the northern Ohio district.

The Westcott Chuck Company, Oneida, N. Y., has announced the appointment of **Herman H. Hobelmann**, 744 Harrison St., San Francisco, Calif., as its district representative in the states of California, Oregon and Washington; also in the Reno district of Nevada.

The Bullard Company, Bridgeport, Conn., announces the appointment of **Edward Neale** as the Chicago direct representative, working in conjunction with **Marshall & Hushart Machinery Co.**, 571 Washington Blvd., Chicago, Ill.

The Whiton Machine Co., New London, Conn., announces the appointment of the **Valley Supply and Tool Company**, Aurora, Ill., and the appointment of **Bansbach Machinery Company**, Chicago, as its agent to handle the sale of its products in the Chicago area.

The Whiton Machine Co., New London, Conn., announces the appointments of **Anderson & White Supply Co.**, 2910 West Armitage St., Chicago, as its agent to handle the sale of lathe chucks and centering machines, and **Standard Equipment & Supply Co.**, Hammond, Ind., as its agent to handle the sale of lathe chucks.

### ARE YOU A TAPPING EXPERT?

Answers to Quiz on Page 144.

1. True
2. False
3. False
4. False
5. Great Britain
6. Resistance to torsion and impact stress
7. Less than .450"
8. ( 8) Internal Center
  - ( 5) Cutting Face
  - (10) Chamfer
  - ( 2) Land
  - ( 7) Point Diameter
  - ( 6) Thread Relief (Radial)
  - ( 4) Flute
  - ( 3) Heel
9. ( 1) Size of the Square
  - ( 9) External Center

The appointment of the **W. S. Ehrenfeld Co.**, York, Pa., as a distributor for York and surrounding territory by Carboloy Company, Inc., Detroit, is announced.

The Landis Tool Company, Waynesboro, Pa., announces that **The C. F. Bulotti Company**, San Francisco, has been appointed distributor for northern California and western Nevada; and that their exclusive distributor for the state of Utah and surrounding portions of Idaho, Wyoming and Nevada is the **Lang Company**, Salt Lake City, Utah.

**Hauser Machine Tool Corporation**, Manhasset, N. Y., has been appointed exclusive U. S. factory representative of Tornos Works, Ltd., Moutier, Switzerland.

The Weldaloy Products Co., Detroit, are retaining **The John D. Tebben Co.**, Detroit, as sales consultants for the Weldaloy line of resistance welding products.

Kalamazoo Stove and Furnace Co., has appointed **William C. Allen**, of Birmingham, Ala., as Southeastern regional manager to set up and supervise a distributor organization in a nine-state area.

**Hauser Machine Tool Corporation**, Manhasset, N. Y., has been appointed exclusive U. S. factory representative for Schaublin Ltd., Bevilard, Switzerland.

The Rotor Tool Co., announces the appointment of **Russel & Olson Company**, 15815 James Couzens Highway, Detroit 21, Mich., as exclusive agents for the Detroit-Toledo and Michigan areas.

The Hartford Special Machinery Co., Hartford, Conn., announces the appointment of two new exclusive agents to handle their machinery: **Joseph Windheim**, with headquarters in Rochester, N. Y., will cover the Buffalo-Rochester-Syracuse territory. **Lloyd and Arms, Inc.**, 3818 Chestnut St., Philadelphia, will cover eastern Pennsylvania, southern New Jersey, Delaware, Maryland, northern Virginia and the District of Columbia.

The Whiton Machine Co., New London, Conn., announces the appointment of **Jack Brewer**, 1060 So. Broadway, Los Angeles 15, Calif., as its exclusive representative in southern California.

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## Big Shaper Performance Small Shaper Price

The SHELDON 12" Back-Geared Shaper is neither too big, nor too small. It is just right for most shaper work in most tool rooms and shops.

In weight, design features, capacity and performance, it is a "big shaper." In price, operating cost and floor space, it resembles a "small shaper." It is the logical 1st shaper for the small shop and installations in large plants.



Write for Shaper Catalog that shows, describes, and gives specifications of this shaper and its available accessories.

**SHELDON  
No. 8000  
12" Back-Geared  
SHAPER**

### SHELDON MACHINE CO. Inc.

*Manufacturers of Sheldon Precision Lathes • Milling Machines • Shapers*  
4242 N. KNOX AVENUE • CHICAGO 41, ILLINOIS, U. S. A.

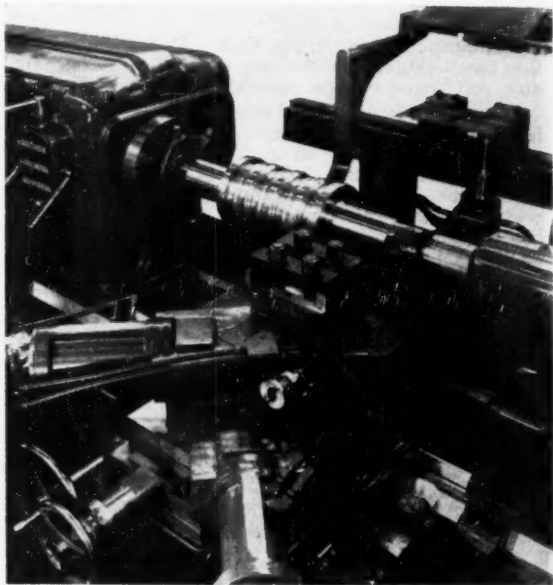
# *What's New in* **METALWORKING**

## **HYDRAULIC ROLL-DUPLICATING LATHE**

An important machine has been developed and perfected by The American Tool Works Company, Cincinnati, Ohio, for producing rolling mill shape rolls.

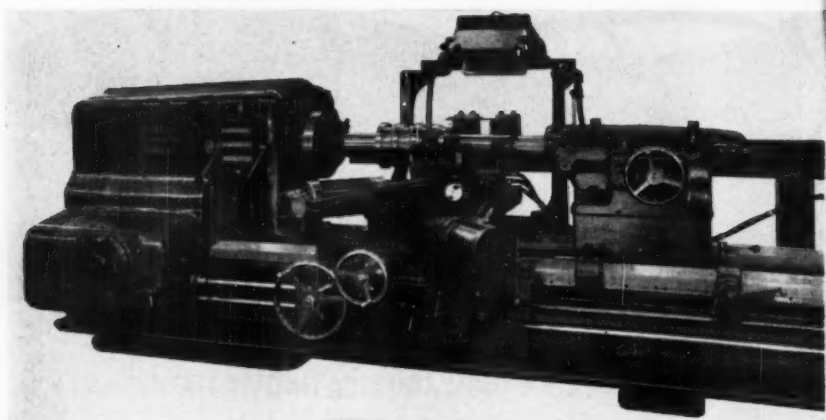
The important feature of this equipment is the use of a hydraulic duplicating mechanism for controlling the cutting tool as it reproduces from a template the desired roll shape on either chilled iron or steel roll blanks. The mechanical feed, through the conventional quick change gear mechanism, is continuous while the tracer controlled angular slides give stepless generation of the contours, which is largely responsible for the high degree of accuracy and finish on the rolls.

Standard round nose cemented carbide cutting tools are used for both the roughing and finishing operations and is driven by a 40 h.p., constant speed motor. The component parts of the lathe are massive and rigid, offering adequate substantiality for machining rolls up to 26" in diameter.



For generating the roll grooves a dual slide, all-hydraulic duplicating mechanism is provided. The slides have nitrided guideways for permanent accuracy. The two slides, one of which is superimposed on the other, are mounted at 45° to the work axis and at 90° to each other, with the cutting





tool mounted on the upper slide. With this combination of slides any conceivable roll shape can be generated.

The only departure from conventional lathe construction is the hydraulic duplicating mechanism which is easy to operate and control. The hydraulic equipment employed is simple and compact and is the same as that which has been used so successfully for years on American Shaft-Duplicating Lathes with single slides. It consists of a motor driven hydraulic pump which supplies the 300 lbs. per square inch hydraulic pressure, a hydraulic tracer valve which meters the oil directly to the cylinders, which in turn control the movement of the slides which support the cutting tool. The pump unit is located on the floor at the rear of the lathe. The tracer valve is mounted on an independent

slide, the movement of which is controlled from the front through a screw and nut by the small handwheel at the right of the top slide. This positioning of the tracer valve is the means by which the relation between the stylus and the finish turning tool is established before cutting is begun. A micrometer dial, graduated in thousandths and reading directly on the work diameters, is located on the adjusting handwheel for accurately determining the diameters desired. Side positioning of the tool in relation to the roll blank is accomplished by the micrometer adjustable template support bar. A sensitive, manually controlled lever is provided for quick advance and retraction by power of the angular slides.

An additional operating convenience

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TOWNSEND RIVETERS join rugged steel or fragile mica safely and at low cost. There is a Townsend Machine ideally suited to your particular assembly requirements. WRITE FOR FULL INFORMATION.

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and safeguard is provided by a hydraulic lock controlled by a small operating lever at the front by means of which the functioning of the duplicating mechanism is arrested while the cutting tool is being retracted from a groove, thus eliminating any danger of bumping the tool against the sides of the groove during withdrawal. After withdrawal of the cutting tool this same lever, when thrown in the opposite direction, releases the hydraulic lock and permits the tool slide to again advance to the work by power, thus reducing operative effort to a minimum.

The headstock of this machine is the conventional Pacemaker Lathe headstock, providing through 3 selective spindle gears 27 speeds in close increments with low speeds to accommodate form tools, if and when necessary, and high speeds for the effective use of cemented carbide turning tools. The cutting tools are held in a massive 4-stud tool holder and the long tools are supported by underneath adjustable supports extending out to impart the maximum rigidity and life to the tools. When tool changes are required, and also for the original tool set-up, tool setting gauges are used which make tool set-up a matter of a couple of minutes instead of the tedious job it would otherwise be. Made by The American Tool Works Co., Cincinnati 2, O. 1

#### MONTGOMERY B.B. LIVE CENTERS

New additions to its line of Ball Bearing Live Centers have recently been introduced by Montgomery & Co. Because of its ball bearing construction, the



Montgomery Live Center eliminates burning and regrinding and permits a heavy load capacity, making it possible for it to take a thrust load to 60,000 lbs. The

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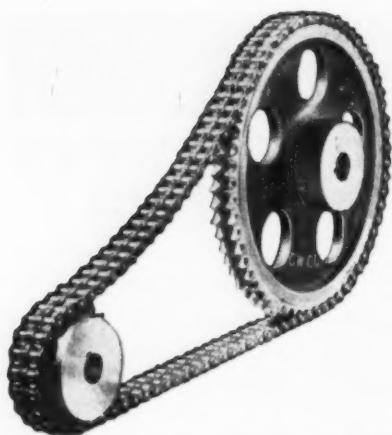
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There are important advantages in bringing your sprocket requirements to Cullman Wheel. Chief among these is the fact that in fifty-five years of specialization in the design and manufacture of sprockets and kindred power transmission parts, has built up the amazing total of over eighty thousand sprockets in stock. Invariably your requirements can be met quickly from this great sprocket and chain inventory. This always brings the cost down. Quick delivery is also available at Cullman on special made to order sprockets. Send your blue prints for recommendations and estimates.

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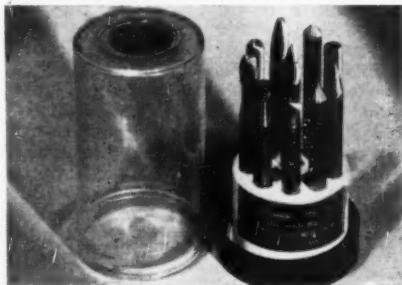
**CULLMAN WHEEL COMPANY**  
1350 W. Altgeld St., Chicago, Ill.

point is made of tool steel, hardened and ground. Concentricity is assured by grinding shank and centerpoint on Montgomery's own patented jig.

The Live Centers are provided in 12 different standard models, 25 different semi-standard models (those for which patterns, jigs, etc. have already been made), or may be made especially to customer's specifications. The company's Line of Bull Nose Centers go up to 40,000 lb. capacity and  $7\frac{1}{2}$ " nose diameter. Montgomery & Co., 53 Park Place, New York 7, N. Y. <sup>2</sup>

### SEVERANCE EXTENDS LINE OF CARBO-MILLS

The Severance Company has extended their  $3/32$ " and  $1/8$ " shank series of Carbo-Mills to include a  $1/4$ " shank set. The Carbo-Mill is a tool of Severance design manufactured of solid carbide. The new  $1/4$ " shank set is furnished in a Visi-Case and comprises the ten most popular shapes (see illustration).



It is stated by the manufacturer that these tools will stand more abuse than is ordinarily given carbide tools, and that they will operate satisfactorily at speeds lower than is generally accepted for similar carbide cutters.

This type of tool covers a large range of uses such as: removing gates, fins, and risers; breaking sharp corners and edges; machining carbon, finishing castings of any material; grinding radii and grooves; deburring oil holes; blending welds and assembled parts; and removing weld beads.

They may be ordered individually as well as in sets and when dull can be re-ground by returning them to the factory. Since all Carbo-Mills are constructed of solid carbide, repeated regrinds are practically unlimited. Made by The Severance Company, 922 Iowa St., Saginaw, Mich. <sup>3</sup>

### IMPROVED GEARMASTER READING MICROMETER

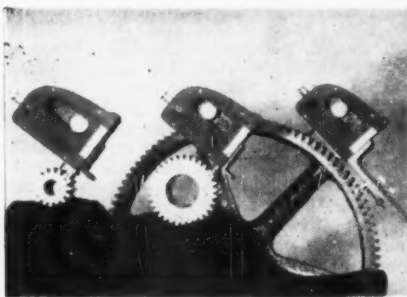
The new Gearmaster ten-thousandth reading micrometer and special spur charts have been designed and constructed to provide the user with all measurements and characteristics in a gear in one set-up, and in a single operation.

The body of the instrument and extension bars for large gears are now made from Invar-Nickel Alloy-Steel that will not expand in any operating temperature to which the instrument may be subjected.

This improvement now enables machine builders to follow their gears right into the assembled machine, to check them while hot from operating tests, and to compare measurements to those when the gears were cold. The instrument registers exact measurements at any temperature in which the user can work, with absolute precision.

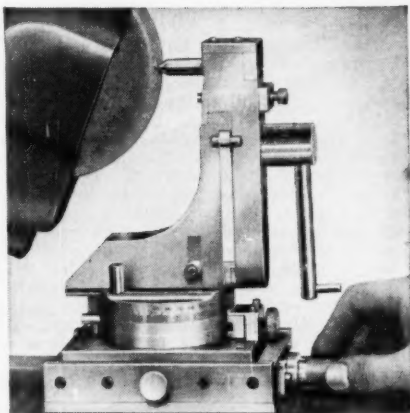
The Gearmaster system of measurement is applicable to spur, helical, herringbone, and internal gears, and to silent and roller chain sprockets.

Complete, easily understood instruc-



tions are part of the system, so that any mechanic can determine chordal measurement, tooth thickness, tooth spacing, tooth form, tooth pressure angle, backlash allowance, diametral pitch, pitch diameter, and possible mandrel runout, in only a fraction of the former time required for such computations. Urbauer Engineering Co., Naperville, Ill.

The Platecoil Division of the Kold-Hold Manufacturing Co., Lansing, Mich., has appointed four new eastern representatives, as follows: The Paul B. Huyette Co., Inc., Philadelphia; H. R. Houghton Co., Baltimore; W. B. Parsons Co., Boston; Gerald B. Duff Co., Newark, N. J.



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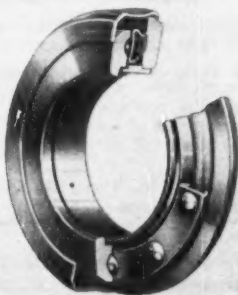
### VISIBLE OIL CUP AND GAUGE IN ONE UNIT

Trico Combination Oil Cups and Oil Gauges can be used both as a visible oil cup to replenish oil in bearings, transmission and crankshaft cases, etc., and also as an oil gauge for the purpose of checking oil levels periodically. Because of the visible feature, they can be installed at any convenient distance from the machine—on the outside of the housing, on the other side of the wall or even around corners of a room. The crystal-clear, shatter-proof plastic bottle keeps the oil supply always visible. All metal parts are plated for corrosion resistance and easy cleaning. The device has a large, self-closing, dustproof filler cap for easy filling and cleaning. The heavy steel base is cemented and roll-clinched to the plastic reservoir, thereby eliminating possible leakage. The unit can be easily and quickly installed. It is available in 1, 2, 4 and 8 oz. capacities. Made by **Trico Fuse Manufacturing Co.**, 2948 No. 5th St., Milwaukee 12, Wis.



### SCHATZ PRECISION CLUTCH RELEASE BEARINGS

A complete new line of precision clutch release ball bearings for industrial and automotive applications is being manufactured in a wide range of sizes by **The Schatz Manufacturing Company**. Both angular contact and thrust bearings (illustrated) are included.



Important operating features of the new bearing line are its superfine race finish which prevents overheating of the bearing, and a specially designed U-type cage which traps and retains the original grease in the raceways and supplies lubrication to the rotating balls without leakage.

Sizes for every make and model 1949 passenger car, truck, bus, and off-the-highway equipment are included in the Schatz clutch release line for automotive application. The bearings are interchangeable with all other makes. **Schatz Manufacturing Co.**, Poughkeepsie, N. Y.

### GAUGE CUT-OUT FEATURES POSITIVE PROTECTION

Greer Hydraulics Inc., announces a new Gauge Cut-Out. This unit, Model DV15-200, was designed to meet the demand for an automatic device to protect all gauges in multi-gauge pressure systems and to eliminate the necessity for manually shutting down each gauge in the system when that gauge is not used.

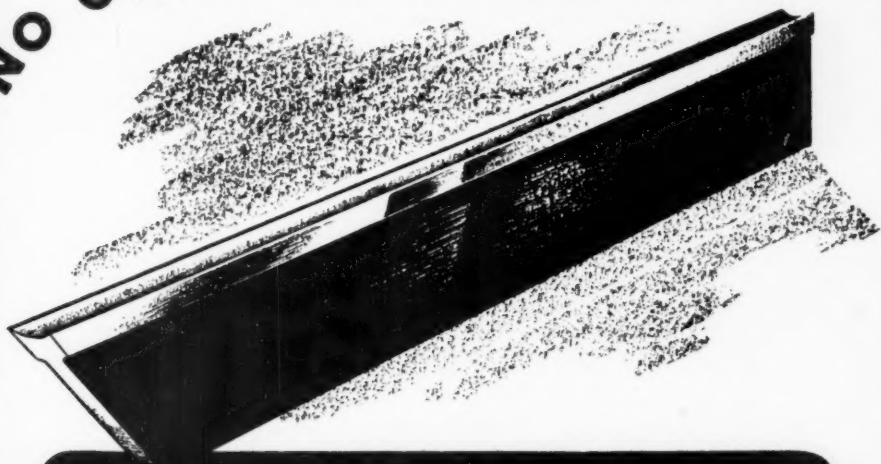
Installed in any gauge line, the Greer Cut-Out is said to provide absolute protection for that gauge by automatically cutting it out of the circuit if the line pressure should suddenly rise above the safe operating range of the gauge.

Its positive opening and closing action eliminates the use of a relief valve and shut-off valve for the gauge, as well as the necessity for the operator having to close the shut-off valve to that gauge manually. The cut-out is made in two series: a low pressure series ranging from 30 to 300 p.s.i., and a high pressure series ranging from 400 to 3000 p.s.i.



It is made by **Greer Hydraulics, Inc.**, 454 18th St., Brooklyn 15, N. Y.

**NO OTHER CUT-OFF BLADE LIKE THIS!**



## **Luers Patented Cut-off Blade**

Empire Tool Co. is the **LEADER** in cut-off blade developments—backed by twenty years' experience in cut-off blade manufacture.

Cut-off blades are tools subject to conditions different from those of other tools and will perform most efficiently only when specialists' recommendations are followed.

Available from stock are blades of four types of high speed steels developed to meet the demands of cut-off operations. And on short notice you can get blades of cast alloys and tungsten carbide.

Empire's Luers blades are *guaranteed* to run faster and with less down time than any other.

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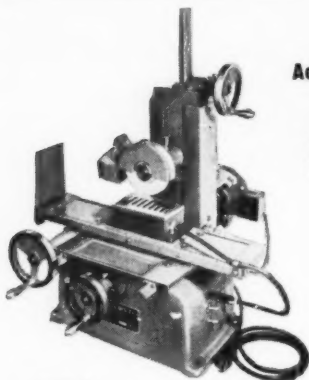
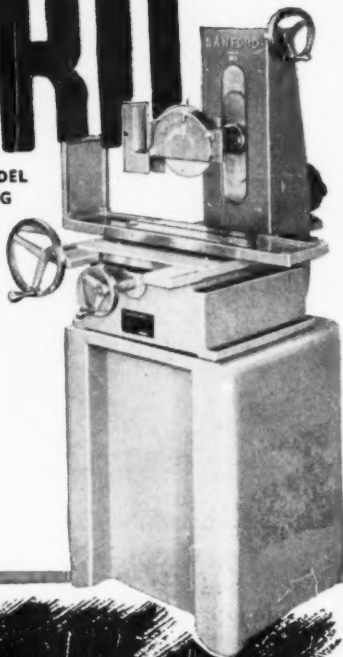
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Handles wide range of Tool and Production jobs, form and crush grinding, dry or wet.

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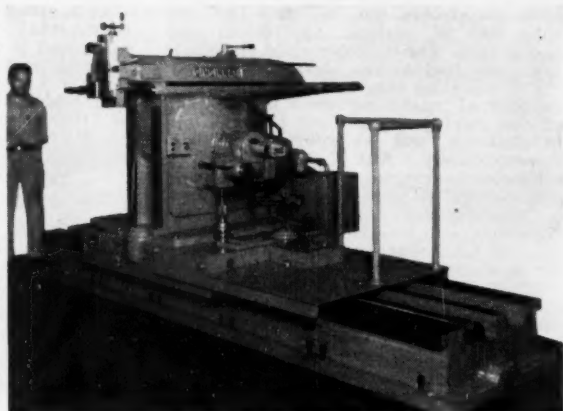
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## NEW CINCINNATI SHAPER HAS 8-FOOT TABLE TRAVEL

A new design in traveling shapers has been developed. This machine, designed primarily to meet the requirements of a Swiss motor generator manufacturer, can also be used by other parts manufacturers who require shaping over a large area of travel. Employing the method of travel of a boring mill, the machine is capable of shaping a surface requiring up to eight feet of table travel without the need for resetting the work piece. Even longer table travel is possible by lengthening the ways.

The shaper is built with a 36" ram stroke, and is provided with either hand or power feed and built-in power rapid traverse. It has two complete automatic oiling systems, one for the shaper ram, feed and drive mechanism, and one for the saddle and ways on which the shaper



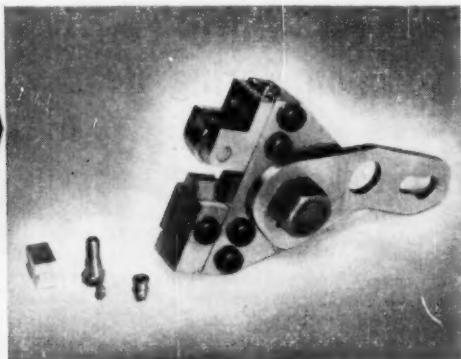
rides. A Bijur foot operated pump for re-establishing an oil film after the machine has been idle is also included. A full length scale in the center guide

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The LITTLE SHAVER, designed for operation on Brown & Sharpe automatic screw machines, is adapted to standard tool holders in the same manner as a circular form tool. Sturdy, compact and simple in adjustment, the LITTLE SHAVER with standard or special formed tool and roll is the answer to your close tolerance problems all day long. And LITTLE SHAVER is inexpensive, too!

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bearing, with a vernier, vernier light and magnifying glass permits very accurate settings. Ram speeds are available from 8 to 102 strokes per minute. The tool slide has 9" vertical adjustment and power feed. The operator rides on a platform attached to the saddle.

The traveling shaper was built for the purpose of machining steps in the ends of cast steel generator half rings 20 feet in diameter, and weighing seven tons. Approximately 8 feet of the ends of two semi-circular rings are shaped on a single set-up, thus reducing the time required for machining to a minimum. The machine can also be used for shaping cross slots in pressbeds or long die shoes, or for machining long, interrupted surfaces that do not lend themselves readily to planing. The unit has application in the large shops of manufacturers of turbines and generators, in ship yards and metalworking plants in general. Made by The Cincinnati Shaper Co., Hopple, Garrard and Elam Sts., Cincinnati 25, O.

#### JOHNSON ALL-PURPOSE BELT SANDER

A new all purpose 3" belt sander has recently been developed by the Johnson Manufacturing Co. Made of aluminum,

it can be used as either a stationary or portable machine, depending on its power connection.

As a stationary machine, the unit can be mounted either horizontally or vertically, and is powered by an electric motor and pulley. An exclusive new feature is a combination stop and fence unit which tilts to 45° and can easily be attached to either side of the sander



frame or placed on either end, making possible a wide variety of sanding operations. Various type abrasive belts can be placed on the sander which enable

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These UNCONDITIONALLY GUARANTEED precision boring tools are available in 3 sizes with capacities ranging up to 15" (Maximum bar capacity 1").

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Lapping Compound that cuts  
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it to be used not only on wood, but on metal and other surfaces as well. A simple adjustment of thumb screws (secured with lock nuts) tightens and aligns the 3" x 24" belt which can be run in either direction.

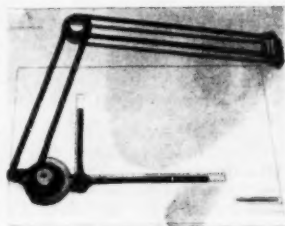
Since it weighs only 4 pounds, the Johnson belt sander can be used as a portable machine by powering it with

electric drill, flexible shaft, lathe, or any other machine tool with a chuck capacity of 5/16". A simple adjustment enables it to sand contour surfaces. The unit measures 3" x 4" x 11" overall; the belt is 3" x 24". Pulleys are 2 1/4" in diameter, and shafts are 5/16". The sander is made by Johnson Manufacturing Co., Lincoln Park 7, R. I. 9

### NEW WRIGHT DRAFTING MACHINE

Eliminating all obstructions along the top edge of the drawing area, the new Model D Wrigraph Drafting Machine mounts in the extreme right hand corner of the drawing board instead of the center or left corner, as on conventional drafting machines. The instrument permits free movement of the scales over the entire drawing area without interference.

The unit is designed for the thousands of smaller drawings which are made in every organization. It is portable, for the use of technicians who want to carry a machine with them. The drawing area is 20" x 26". The machine can be easily fastened to any board or table.



The ball-bearing precision drafter is accurately calibrated by means of eccentric adjustments built into the mechanism. Interchangeable engine-divided scales in all of the standard graduations are avail-

able. The lightweight protractor can be locked at any angle. The Wrigraph Model D is available in two sizes, and is guaranteed for accuracy. Made by L. C. Wright, Inc., Box 63BF, Cleveland 21, Ohio. 10

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HAND SCREW



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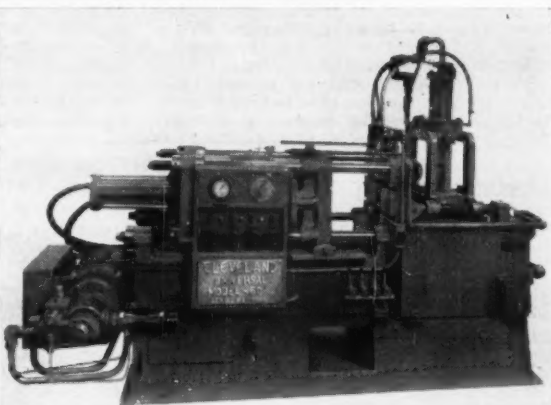


## CLEVELAND UNIVERSAL DIE CASTING MACHINE

The new Model 50 Cleveland Diecasting Machine is a high pressure hydraulic unit. It is equipped with a Vickers two-stage pump driven by a 10 h.p. direct-connected motor. The pump delivers 43 gal. per minute at the low pressure stage and 10½ gal. per minute at the high pressure, or 500 lbs. p.s.i. stage. The hydraulic system, also, includes Vickers oil filters, a heat exchanger, and a 70 gallon capacity oil reservoir.

The machine can be furnished either as a cold chamber machine for casting aluminum or as a gooseneck type for casting zinc, tin or lead. One shot end can be quickly removed and changed to the other type end, if desired.

Either automatic or manual controls can be supplied. The automatic controls provide a flexible, electrically operated



set of controls which can be timed to the exact diecasting desired. This control can be operated manually, for set-up

## NOTCHING TUBING OR PIPE ENDS EASILY WITH

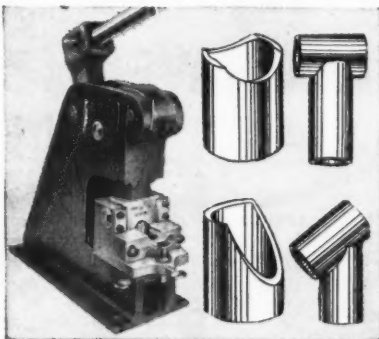
# ARC-FIT

Patent No. 2,126,519

## IN POWER PRESS OR HAND PRESS

Arc-Fit is a notching unit for preparing pipe or tubing ends in making welded or brazed tubular joints. Arc-Fit will prepare the ends of a pipe or tube in less than 5 seconds. Arc-Fit is a production tool that will cut your production costs. It is applicable in any industry where pipe or tubular construction is used.

- Arc-Fit can be utilized in any power press.
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- Arc-Fit does not deform pipe or tube. No grinding or finishing operation is needed.
- Engineers can now design for tubular construction and cut costs.

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2525 Moffat Street

Chicago 47, Illinois

purposes, when the selector switch is set for manual operation. The optional hand-operated manual control can be furnished to any customer desiring a machine at the lowest possible cost.

The Model 50 Cleveland Diecasting Machine has die plates which are 22"x18", and four tie bars which are 2" in diameter. The space between tie bars is 16" x 12" and the die opening is 8". An estimated 50 tons locking pressure is obtained through a toggle mechanism similar to the larger size Cleveland Diecasting Machines.

The machine can produce aluminum castings up to 2½ lbs. and zinc castings up to 4 lbs. The free cycle time of the machine is well over 1000 shots per hour; however, the actual production rate of any casting is dependent upon the complexity and size of the casting itself.

This machine is capable of producing castings of high quality at a high rate of production at a low initial investment as well as low operating expense, according to its manufacturers: **The Cleveland Automatic Machine Co., 4932 Beech St., Cincinnati 12, Ohio.** 11

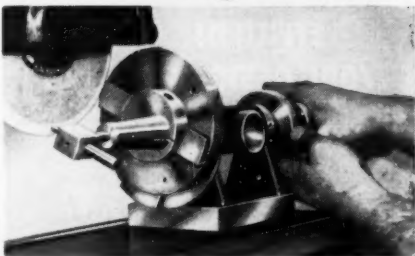
#### ROBBINS & MYERS GEAR HEAD MOTORS

A new line of gear head motors, recently developed by Robbins & Myers, Inc., features a complete range of countershaft speeds for the powering of all types of electrically-activated devices. Basically a standard motor with a self-contained gear reduction mechanism, the



gear head motor is preferable over other types of speed reduction on the basis of compactness, appearance, inherently higher efficiency, and ease of installation or replacement. The advantages of high speed motor performance plus the economies of standardization, dependable

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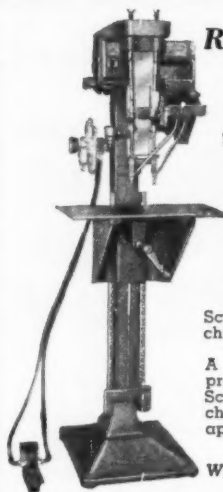
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CHICAGO 7, ILL.

construction, and compactness are aspects of interest to the manufacturer or designer of powered equipment.

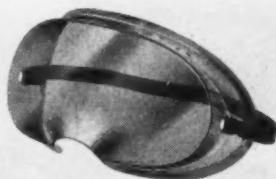
Available for single and double reduction requirements in ratings from 1/200 to 1 1/3 h.p., in reduction ratios from 6:1 to 900:1, and in output torques from 1 inch-pound to 500 inch-pounds, these motors provide a versatile application. Counter-shaft speeds ranging from 833 to 8 r.p.m. permit their use in a wide variety of applications ranging from timing devices to conveyor drives. Depending upon the motor frame size employed, the counter-shaft can be located in increments of 30° or 90° relative to a horizontal center line by relocating the gear head on the frame.

Induction hardened alloy steel worms and bakelite or bronze gears, provide high reductions in small space, permit efficient operation, and long life. Made by **Robbins & Myers, Inc., Springfield, Ohio.** 12

**NEW LIGHTWEIGHT SAFETY GOGGLE**

A new safety goggle is announced by the Chicago Eye Shield Company; called the Coverlite, it weighs only 97/100 of an ounce, with this negligible weight being distributed evenly over the nose, brow and cheeks. Workers say they are hardly aware of wearing the Coverlite.

The new goggle is exceptionally sturdy. The injection moulded, non-flammable plastic frame gives full protection from impact, dust, flying sparks and chips. Ample air space and ventilation prevents fogging, while the large frontal area provides a wide range of vision in all directions. Another feature is the easy-to-adjust elastic headband.



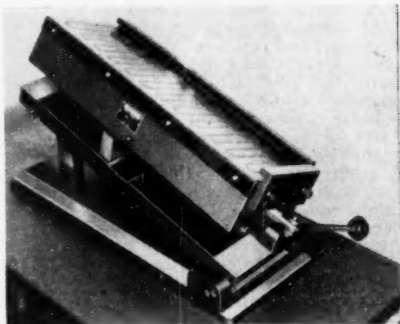
Useful in buffing, polishing, light assembly and spot welding operations, the Coverlite is available in clear, light green or dark transparent frames. The design also permits comfortable wear over most types of prescription glasses without interference to the wearer. The Coverlite goggle is made by **Chicago Eye Shield Co., 2300 Warren Blvd., Chicago 12, Ill.** 13

## MAGNA-SINE EQUIPPED WITH PERMANENT MAGNET CHUCK

A new 20" series of the versatile Magna-Sines, has been introduced; they are designed for use on production-type surface grinders. This new series is equipped with a permanent-magnet chuck measuring 7½" deep by 20½" long and can be used for either wet or dry grinding.

With the Magna-Sine in closed position, it is used as a conventional magnetic chuck for holding parallel work. For either a single angle or compound angle job, the unit can be quickly set up with standard gauge blocks by the sine bar method. The Magna-Sine is a versatile magnetic chuck in production work; the manufacturers claim that its use will eliminate many costly and complicated special work-holding fixtures for angular work.

The new 20" series of Magna-Sines is sturdily built for production use and



is machined and constructed for absolute angular accuracy. Made by **Omer E. Robbins Co., 5722 Twelfth St., Detroit 7, Michigan.**

14



No. 10



No. 11



No. 12



No. 13



No. 14

## Again FIRST with the FINEST

This new laboratory graded MICRO fine diamond powder has half the particle size of our famous No. 10. It will produce

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hoped for but never before possible on the hardest metals. . .

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**Foolproof . . . Economical**

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### A-1 ABRASIVE LABORATORIES, INC.

139 DUANE ST., Diamond Building

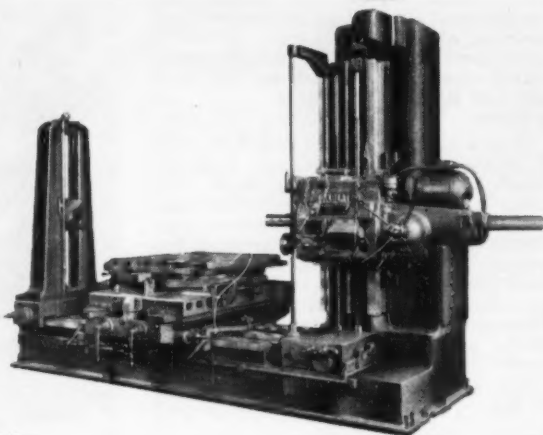
New York 13, N.Y.



## CINCINNATI-GILBERT HORIZONTAL BORING, DRILLING AND MILLING MACHINE

A new Cincinnati Gilbert horizontal boring, drilling, and milling machine features a single hardened  $3\frac{1}{2}$ " diameter spindle with maximum spindle speeds of 1420 r.p.m.; a built-in reversing motor equipped with anti-friction bearings throughout, with the spindle sleeve mounted on pre-loaded zero precision ball bearings; hardened ways for the bed; pressure lubrication to all running parts; centralized control for all spindles speeds, feed changes, and feed selection; power rapid traverse, starting, stopping and reversing of spindle and all feeds.

The built-in rotary table is not an accessory but is an integral part of the machine. The table unit has a cross feed and power rapid traverse on its saddle. The table



top is clamped to its base by a 47" diameter ring clamp, acting on an angular surface of the table top. This clamp is

For ANY Size Machine

# Chandler-Duplex

COMBINED Boring  
and Facing Toolhead

**A Boring Head  
That Won't Face  
Is NOT Complete**

**POWER FEED  
FOR FACING  
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Openings  
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**Accuracy  
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**CHANDLER TOOL CO**  
MUNCIE, INDIANA, U. S. A.

closed by a screw which in turn is actuated by a ratchet handle.

The table top is mounted on large diameter anti-friction bearings and is centered on a large diameter king pin equipped with opposed tapered roller bearings. The flat ways are lubricated by a pressure system, thus making it easy to revolve the table top by hand even with heavy loads imposed upon it. The table top is furnished with a working surface of 44" in diameter or 44" square, and is surrounded by a coolant trough. The cutter coolant passes through the table to the base and then through the saddle to the bed; thus the coolant is confined to the machine. The table top is graduated to read in  $\frac{1}{2}$  degrees.

The machine can be arranged with the table as follows: (1.) Hand revolving. (2.) Hand revolving through a Hindley type worm and wormwheel. (3.) 16 power feeds and rapid revolving of the table top. In this case, the power is taken from the main feed mechanism of the machine.

The spindle head, column, bed and saddle and the boring bar support are standard units used on the standard rectangular table type Horizontal Boring, Drilling and Milling Machine.

Information on this machine is contained in Bulletin 348, available from the manufacturer. The Cincinnati Gilbert Machine Tool Co., Cincinnati, Ohio. 15

#### NEW GRAPHITE LUBRICANT IN POWDER FORM

A new powder lubricant identified as "Grafize", together with its refillable applicator, has recently been introduced. "Grafize" is a lubricant in powder form for the lubrication of delicate instruments; it is equally applicable in places where oils and greases are not indicated, such as in locks, hinges, window slides, fire arms, tools and switches.



The manufacturers state that with the use of "Grafize" and its applicator, lubricating jobs can be accomplished without the dirty, unpleasant after-effects which are usually attendant upon such operations. A free test sample is available upon request to the manufacturer: Reardon Products, 2104 S. Adams St., Peoria 2, Ill.

16

## GEARS

### Small and Medium

SPURS  
(internal and external)

HELICALS

STRAIGHT

BEVELS

SPROCKETS

RACKS

WORMS

WORM  
GEARS

THREAD  
GRINDING



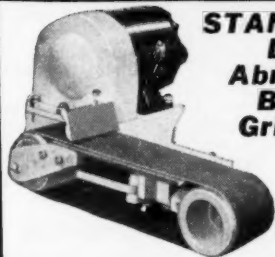
COMPLETE  
GEAR  
TRAINS

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## BEAVER

GEAR WORKS, Inc.

1033 Parmelee St., ROCKFORD, ILL.



### STANDARD D-4 Abrasive Band Grinder

Famous  
for  
Stamina

This new, streamlined bench type grinder assures fast, quality finishing on metals, plastics, wood, fibre... at low cost. Built to machine tool specifications, Standard D-4 is equipped with improved band tension control and specially designed protective motor hood 4x36 $\frac{1}{4}$ " band. The ideal portable unit.

OTHER STYLES AND SIZES IN NEW  
MANUAL ON FINISHING—WRITE TODAY

WALLS SALES CORP.

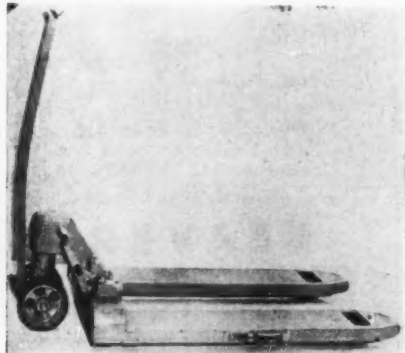
306 E. 38th St., New York 16, N. Y.



### BRAKE FOR LIGHTWEIGHT PALLET TRUCK

A combination brake and bumper, simple in design, but effective in use, has been added to the Lightweight Hydraulic Pallet Truck manufactured by Lyon-Raymond Corporation.

This new device consists of a curved steel plate which is welded to the bottom of the towing handle. When the handle is raised, the plate extends out in front of the truck and acts as a bumper if the truck is run up against a solid object.



By holding the handle down, the plate contacts the floor, acting as a brake. Greater downward pressure on the handle increases the braking action. It is especially useful for easing capacity loads down ramps.

This new feature has been incorporated as a standard specification to the Hydraulic Pallet Truck, made by Lyon-Raymond Corp., 21161 Madison St., Greene, N. Y.

17

### NEW FARRELLOY SOLDERING FLUX

Farco Soldering Salts, containing Spirits of Metal, is a pure white crystal that instantly dissolves in two parts of water or more. A welder can make his own flux of any desired strength to fit the job on the spot. The Spirits of Metal contained in the Farco Salts increases the attractions between the atoms of the molten solder and the metal surface to which it is applied, thereby increasing the wetting action on the metal, also increasing the tinned surface and the tensile strength of the bond.

Tests show that flux made with Farco Salts containing its new chemical action shows an almost complete absence of porosity; this is useful where watertight sweat jobs are required.

Since Farco Salts dissolve in water, this is an added safety factor against corrosion which is eliminated by merely washing away the residue with water. It is also acid free.

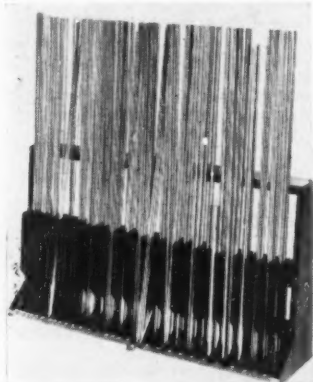
Farco Salts is said to be an efficient flux on galvanized iron, steel, iron, brass, copper and most other common metals. It is also claimed to be excellent for cleaning and retaining the tin on soldering coppers. It is made by Farrelloy Co., 1231 North 26th St., Philadelphia 21, Pa.

18

### DRILL ROD STORAGE RACK

A compact rack for the convenient storage of 3-foot lengths of standard drill rod has been developed by the Hill Machine Company. It is claimed that its cost is quickly recovered through the utilization of short ends ordinarily wasted and the saving of time in the selection of sizes.

The ends of the rods rest in steel trays between adjustable separators. Any size is easily selected by pulling its tray forward by the extending tab. This moves the rods forward, separating them from adjacent sizes so that they can be easily grasped. Short ends can be easily distinguished. The illustration below shows two trays in the forward position. Sixty divisions  $\frac{1}{2}$  inch wide are provided. For large stocks of popular sizes or large diameters, separators can be removed to make wider divisions. Extra trays 1" and  $1\frac{1}{2}$ " wide are furnished for wide divisions. Cards containing adhesive labels

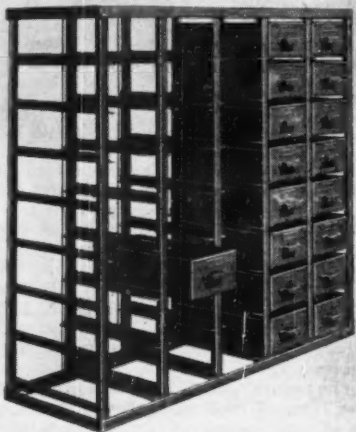


for all number, letter and fractional sizes are furnished. Weight is 40 lbs. Made by Hill Machine Co., 1043 W. State St., Rockford, Ill.

19

### STERLING STEEL STORAGE RACKS

A useful, space-saving parts rack for stock rooms and assembly floors is provided by the new 5-unit rack made by Sterling Factory Equipment Co. By using these all-steel units, plant and stock room workers can save both time and space. The racks utilize that space above the floor which is available, yet costs nothing.



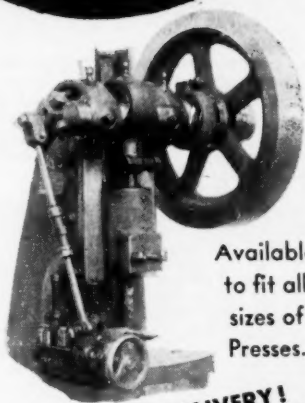
Shop boxes containing stock parts can be filed by means of Sterling racks, like correspondence. The stock-room clerk can arrange the boxes so as to make finding the correct part as easy to find as a letter. There is less chance of misplaced parts or boxes that take time to locate, since every box is immediately available, the bottom box as well as the top one. These racks further simplify stock-room labor by eliminating the piling of boxes. They are light in weight and can be easily shifted about from one location to another.

By using racks where boxes would otherwise be stored, puts the weight strain on the rack, not on the boxes underneath. This method saves the wear and tear on the boxes themselves.

The racks have the further advantage of being fitted to any size or type of boxes. They are furnished either with or without boxes, and are built in single or in five-section (illustrated) units. They are shipped knocked-down and are easily assembled. Made by Sterling Factory Equipment Co., 189 Charles St., Providence, R. I.

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Available  
to fit all  
sizes of  
Presses.

IMMEDIATE DELIVERY!  
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DIVISION OF ROCKWELL MANUFACTURING CO.  
**HUDSON, N.Y.**

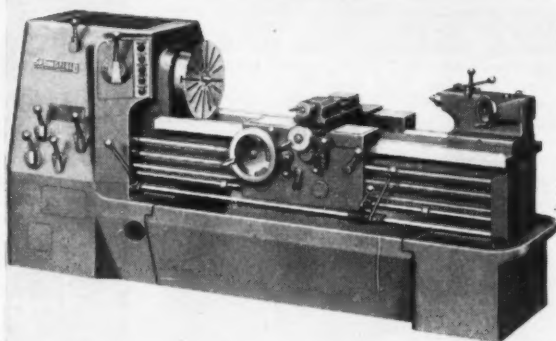
## SPRINGFIELD INTRODUCES NEW MODEL S LATHE

The Springfield Model S is a new design heavy duty lathe. Careful attention has been given to provide rigidity, broad feed and speed ranges for all types of work, convenience of operation, and lubrication facilities and design features to minimize wear and maintenance.

A heavy spindle with 24 speeds is mounted on three heavy duty bearings. A bearing at the middle of the spindle adds rigidity. Ball or roller type spindle bearings are optional. The hole through the spindle can be slightly in excess of 2" when required.

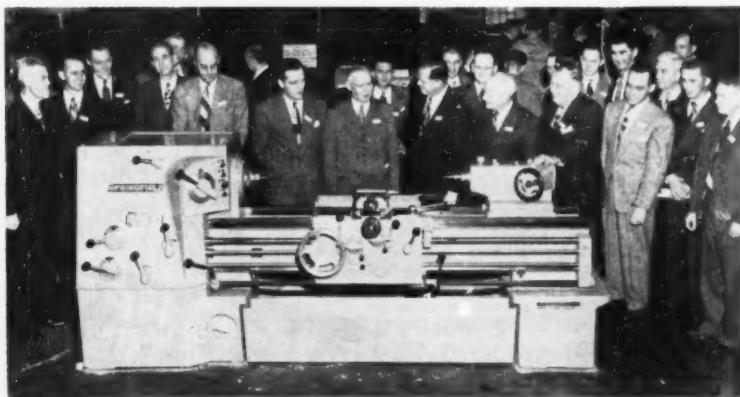
The heavy hardened and ground gears give a speed range of 15 to 1000 r.p.m. and higher or lower ranges can be furnished. A multiple disc, wet type combination clutch and brake running in a bath of oil controls the spindle. Mechanical reverse to the spindle can be had when required.

Two convenient levers control the entire 24 speed changes. One lever has two shifts; the other lever controls 12 gear changes. The shifter mechanism allows shifting directly from any speed to any other speed without the necessity of passing through intermediate points.



Lubrication for all bearings and gears in the head is carried in an oil sump in the cabinet leg, and an automatic pump floods the entire mechanism. The location of the oil sump outside the head minimizes heat rise in the head and spindle and is advantageous on heavy high speed operations. A self-cleaning oil filter is located in the front of the cabinet leg.

The combination of quadrant gearing and the 60-feed and thread gear box gives the feature of providing a quick change over from standard operations to



The above picture, taken at the demonstration and educational meeting recently held in Springfield, Ohio, sponsored by the Springfield Machine Tool Company, shows a group of Springfield executives, representatives of the press and a few of the many members of dealers organizations inspecting the new Springfield Model S Lathe.

metric, module and diametral pitch setups. In addition, the 60-feed box includes all standard threads, and any of the optional ranges have 11½ and 27 pitch, among others.

The extra wide and deep bed takes advantage of a new equilateral triangular type of girthing which gives extra chip clearance through the bed, and has also proved to be much more rigid than conventional designs in tests for torsion, tension, compression and other effects.

The carriage and apron have cross-sections for rigidity and large way areas. The gearing and positive action friction feed clutches in the apron, as well as the cross slide and carriage rapid traverse mechanism, are all automatically lubricated. Anti-friction bearings are used throughout and all controls have interlocks. The carriage and bridge not only bear on the front vee bed way and a flat way at the back of the bed, but additional rigid support is added by locating a bridge bearing on the flat tailstock way at the front.

A tailstock with the handwheel offset 50° toward the operator has two-speed action for slow drilling feeds and rapid advance. Both heavy duty clamping and quick acting light duty clamping are provided. The tailstock spindle clamp and hold down clamp have convenient adjustments.

The full depth chip and coolant pan is completely independent of the machine. It rests on ball casters and can be easily rolled out for cleaning or positioning. The coolant pump is mounted at the rear of the pan and has quick disconnect type hose and electrical couplings.

Complete tool room and engine lathe accessories and attachments are available for the new lathe, including reproducing, profiling, contouring and other unusual specialty units.

The Springfield Machine Tool Company, Springfield, Ohio. 21

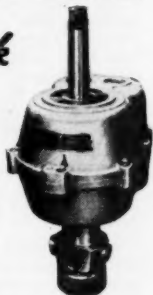
### "UNIVERSAL" CHARGER FOR INDUSTRIAL TRUCK BATTERIES

A new battery charger for charging any type of industrial truck batteries is announced. It is designed to charge 200 to 500 ampere hour lead-acid batteries of 12, 15, 16 and 18 cell capacity, and/or 150 to 450 ampere nickel-iron batteries of 20, 24 and 30 cell capacity. This unit consists of a separately-excited motor generator set with a no-load voltage control of 30 to 60 volts, plus a voltage-drop control. The no-load voltage control is

## TOOL UP FOR THRIFTY TAPPING AND THREADING

### Ettco-Emrick TAPPERS

attached to your drill press spindle, offer a low-cost way to tool up for a wide range of tapping needs at high speeds. Hair-trigger sensitive clutch protects taps and work. Ettco Tappers are ideal where cost, production and accuracy are important factors. Quill clamps are available for maximum rigidity.



7 Sizes for No. 0 to 1" Taps



### Ettco-Emrick THREADERS

are standard Ettco Tappers fitted with acorn or button-type die-holders and dies. They put threading work on a high-speed production basis. Their highly sensitive action assures

4 Sizes for No. 6 to 5/8" Dies accurate, low-cost work.

#### WRITE FOR BULLETIN 22

it gives details and prices on Ettco-Emrick Tappers and Threaders. We'll also send you the name of your nearest distributor.

### ETTCO TOOL CO.

596 JOHNSON AVE., BROOKLYN 6, N. Y.

Boston, Massachusetts • Portland, Connecticut  
Detroit, Michigan • Chicago, Illinois

DRILL & TAP CHUCKS • TAPPING ATTACHMENTS  
MULTIPLE DRILLING & TAPPING HEADS  
DRILLING & TAPPING MACHINES

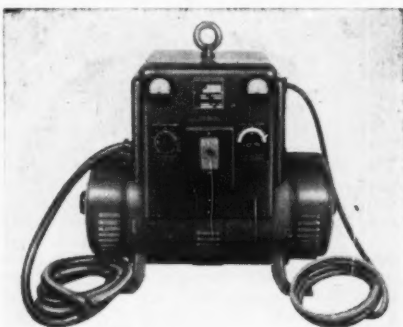
calibrated for the different cell combinations of the batteries to be charged.

These controls are accomplished by the use of a standard carbon-pile regulator which has two coils, the one being a voltage coil which controls the no-load voltage and the other a current coil controlling the amount of voltage drop for a given load current.

In charging lead-acid batteries, the stop on the timer is adjusted for three hours. Turning the knob of the timer to the stop will then start the unit and begin charging. After the charge has proceeded to the extent that the battery voltage has risen to approximately 2.37 volts per cell, a voltage-sensitive relay in the control closes and starts the timer. In approximately three hours the time reaches the zero point, automatically shuts the set down, and disconnects the battery from the charger.

In charging nickel-iron batteries, the voltage control and voltage-drop control are first adjusted for the correct cell and ampere-hour combinations. The toggle switch "A" is then thrown to the "On" position to bridge the contacts of the voltage-sensitive relay. The timer stop is moved from the three-hour position to the ten-hour position. To start

the charge, the battery is first connected to the charger; then the timer is set to the hour rating as given by the Edison charge test fork. The charge proceeds until the timer reaches zero position. At



that time the battery is automatically disconnected from the charger, and the unit shuts down.

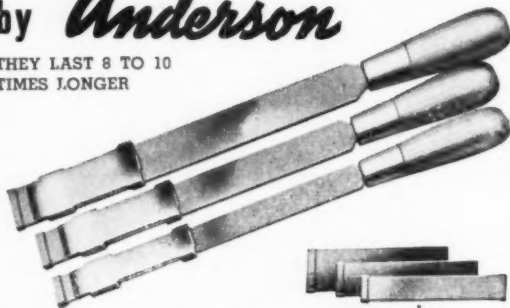
The Universal battery charger is made by Motor Generator Corp., a Hobart Brothers affiliate, Hobart Square, Troy, Ohio. 22

## CARBOLLOY TIPPED SCRAPER BLADES

Especially good for hard alloy iron and extremely hard bronze castings. If you are using Anderson Hand Scrapers it is not necessary to buy complete new scrapers in order to use carbolloy tipped blades. Simply remove high-speed blade and slip in the Anderson Carbolloy Tipped Blade. Available in three widths.

by *Anderson*

THEY LAST 8 TO 10  
TIMES LONGER



Send for Bulletin 12-5

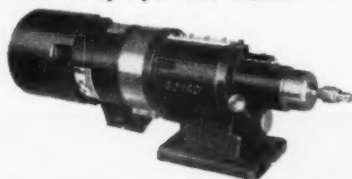
ANDERSON BROS. MFG. CO., Rockford, Ill.



Hand and Power Hydraulic Presses, Balancing Ways, Roto Checkers, Hand and Power Scrapers, Spotters.

### AUTOMATIC DRILLING UNIT WITH FULL HYDRAULIC CONTROL

The Govro-Nelson Co. has introduced its new Model "KH" Automatic Drilling Unit with full hydraulic control. The feeding pressure of the unit is derived from centrifugal force, and is accurately controlled by hydraulic means.

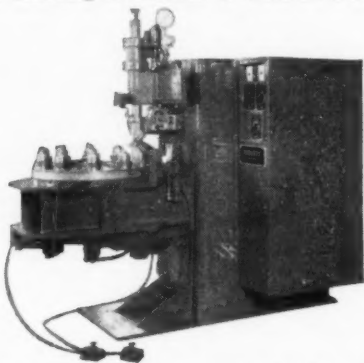


By simple adjustments, the amount of rapid approach, the rate of feed and the overall length of stroke may be changed as desired, thus adapting the unit to short-run as well as long-run production of a variety of parts. The external adjustments permit the use of the unit on a full range of drill sizes with minimum set-up time.

The drilling unit handles 1/32" to 1/4" tools with a standard collet chuck, depending on materials and drilling conditions. With a special chuck, it handles tools up to 3/8" in soft materials. The unit is completely automatic, with remote electrical controls, its mechanism running in oil, with ball bearing suspension. Made by The Govro-Nelson Co., 1933 Antoinette St., Detroit 8, Mich. 23

### DIAL FEED MECHANISM FOR RESISTANCE WELDING

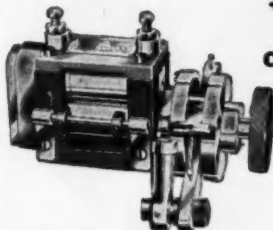
The Sciaky standard welder employs an indexing mechanism to weld an elec-



tric motor housing composed of seven parts. These parts are loaded on a ten-

## A Most Versatile ROLL FEED for ~~\$99.50~~

**\$89.50**  
Net  
Complete



A PRECISION ROLLFEED with Semi-Steel Castings, Hardened and Ground Rolls and Friction Discs. Other sizes priced proportionately low.

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**ROLL FEEDS CORP.**

148 Middle St. Pawtucket, R. I.

station indexing table by hopper and magazine feeds and welded at the rate of 2,000 units per hour. The table is ratchet-actuated and is synchronized with the welder. Shaped mandrels mounted on the table serve as loading fixtures for parts other than those being welded. Where the automatic feeding is not practical, the piece parts are loaded by operators manually. The thickness of the parts welded are .017"-.023"-.029" cold rolled steel. The completed unit, after welding, is automatically ejected into a receiving bin.

The Sciaky welder used for this job makes the three-thickness-weld on a power rating of only 100 KVA. It is equipped with exclusive three-phase controls which cuts current required 75% and draws a balanced load at 85% or better power factor, according to Sciaky Bros., Inc.

The machine's automatic operation enables higher quality welds and accurate location of the piece parts, the manufacturers state. Once the conditions are determined and set, these conditions must prevail for every weld. The unit is made by Sciaky Bros., Inc., 4915 W. 67th St., Chicago, Ill. 24



## THE New MODEL 1100 HYBCO TAP GRINDER



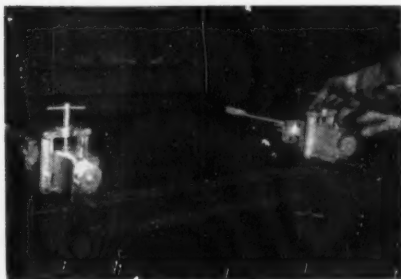
- Capacities No. 2 Machine Screw to 1½" Hand Taps.
- All Settings Adjustable To Give Any Angle — Relief — Hook.
- Taps Held In Precision Collets Can Be Sharpened After Center Is Destroyed.
- Standard Motor — Any Current Specification.

*Representatives in Principal Cities*

**HENRY P. BOGGIS & CO.**  
710 East 163rd Street  
Cleveland 10, Ohio

### INGENIOUS MATERIAL STOP FOR MACHINING OPERATIONS

The Mahl Equipment Co., a division of Standard Iron and Wire Works, Inc., has recently introduced a useful stop gauge which has a wide application in cutting, shearing, punching, bending and sawing operations. The new device, called the "Mule Gauge", has one particular advantage over bolted or clamped rigid gauges, because it recoils with each cutting thrust, then returns to its original position.



In a cutting operation, the work piece is pushed against a work stop which has been set at the required dimension. Regardless of the rigidity of such a stop, the side thrust exerted by the cutting action of the tool will eventually move the stop. This is negligible in short runs, or with single pieces, but in long production runs, repeated cuttings to the same stop will continue to unseat the stability of the stop. An inexperienced operator, in making repeated cuttings would thus unseat the average work stop to such a degree that the last cuts would be so far oversize as to require recutting.

This problem can be overcome by the use of the Mule Gauge. This device is equipped with a compression spring which can be set for heavy or light material. The spring is sufficiently heavy that it cannot be compressed by shoving material against it. If the work piece is rammed against it, the gauge will push it back to its original setting. The spring "gives" during the shearing action, then returns to its original setting, whether one or one thousand pieces have been cut, thus assuring uniformity, the manufacturers claim.

Where the Mule Gauge is used with punches or press brakes, where thrust is no problem, its advantage is that even though it has been clamped into place,

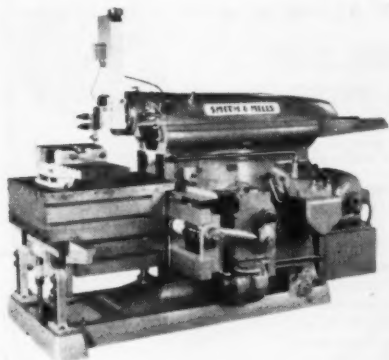
the stop can still be adjusted to correct any error or movement in clamping by adjusting a nut at the rear of the gauge. If after bending or punching the first piece, an error is found, the stop can then be adjusted to correct it. This speeds up set-up time and eliminates the "trial and error" method. This feature is valuable in punch press work to correct hole location and to even up both sides of the sheet when bending. Made by **Mahl Equipment Co., Div. Standard Iron and Wire Works, 2930 N. Second St., Minneapolis 11, Minn.** 25

### NEW SMITH & MILLS HEAVY-DUTY SHAPER

Smith & Mills Shapers, Inc., have added a new heavy-duty model to their line. It is a 32" and 36" shaper, designed especially for use in railroad and production shops.

Greater capacity under the ram is obtained by means of a drop table to increase cross table travel, the table itself has been widened. For standard work, a table filler block is provided to be mounted on the drop table.

Time saving features include horizontal and vertical power rapid traverse to the table, automatic tool lifter, and automatic vertical feed to the tool.



Pictured above is a 32" Shaper built to shape the top and recess both ends of a large semi-steel casting with one set-up. The shaper offers a maximum clearance under the ram of 26½", maximum table travel of 40" and a table width of 30". Made by **Smith & Mills, Inc., Div. of Hamilton Thomas Corporation, Hamilton, Ohio.** 26

# CLIPPER

## PRECISION DIAMOND TOOLS

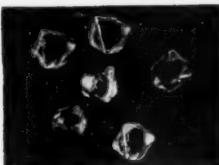
Industrial Diamonds

- Thread Grinders
- Turning Tools
- Engraving Tools
- Dressing Tools
- Diamond Powder



Turning Tool

Every CLIPPER tool is guaranteed. Send blueprints. Let us quote on your requirements.



Representatives in Principal Cities

**CLIPPER DIAMOND TOOL CO., INC.**

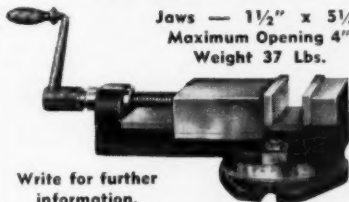
21-D W. 46 ST. N.Y. 19



### NEW BRITAIN

## SWIVEL VISE

Jaws — 1½" x 5¼"  
Maximum Opening 4"  
Weight 37 Lbs.



Write for further information.

The body is made of semi-steel; the jaws of tool steel hardened and ground. All working surfaces are ground. The vise is as accurate as is possible and the degrees are cut to very close limits.

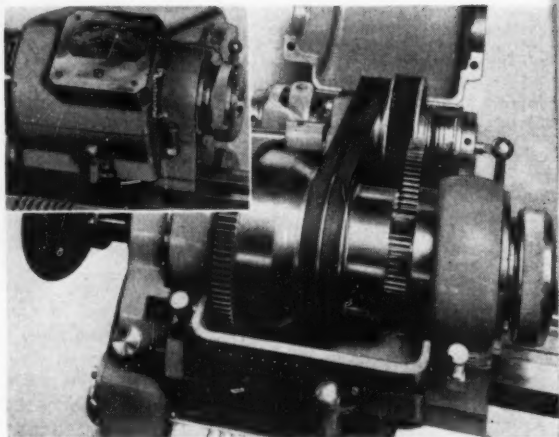
**NEW BRITAIN TOOL & MFG. CO.**

NEW BRITAIN, CONN., U. S. A.

## NEW FEATURES ON WADE MODEL 8A LATHE

Claiming to be makers of the only Toolmaker's Precision Lathe of 1" collet capacity and 8½" swing embodying stepless spindle speeds from 32 to 2000 r.p.m., The Wade Tool Company announce that this new feature is now available on their Model 8A lathe. With the back gears engaged, the stepless spindle speeds are from 32 to 220 r.p.m.

The variable speed drive has an electric tachometer (see inset on picture), located on the face of the headstock housing, which registers all spindle speeds. This drive is entirely mechanical, and is designed for the spindle speed to be changed while the drive is running; however, no damage will occur if the operator should attempt to change the spindle speed when the motor is stopped. This drive features a unique clutch, since the operator can



start, stop, and brake the spindle while the motor is running.

Powered by a 1 h.p. motor, with all controls protected in an enclosed panel,

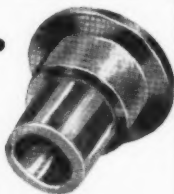
## LEAD SCREW TAPPING...

### ON YOUR OWN DRILL PRESS!

With this ROTOREX tapping head you can convert your drill press to a precision tapping machine in a matter of minutes, and consistently produce Class III threads. To change to drilling, simply swing the ROTOREX to one side.

#### CHECK THESE FEATURES:

1. Positive, automatic control of lead.
2. Hardened, precision ground lead screws.
3. Instantaneous emergency reverse.
4. Complete automatic cycle.
5. Accurate control of depth—accuracy to .010.
6. Foot control frees operator's hand for loading.
7. Capacity 0-80 to ¾".
8. Price \$195.00 complete with Lead Screw, F.O.B. Riverside.



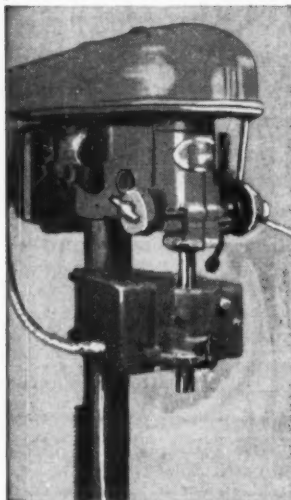
Precision ground lead screw provides accurate, controlled tapping from 0-80 to ¾".



**HUNTER-DOUGLAS CORP.**

Blaine & Pachappa Sts.

Riverside, California



there is ample torque for low spindle speeds due to the back gear ratio of 9-to-1. High spindle speeds are taken care of by the matched V-belts on the open drive. All countershaft bearings of the Variable Speed Drive are ball-bearings, permanently sealed with lubricant.

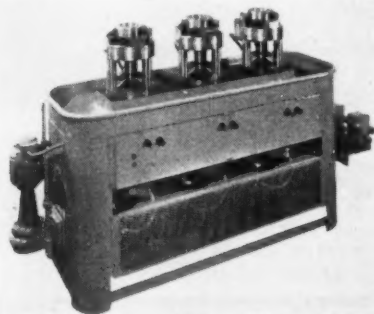
The lathe bed is in the shape of a hollow square, ribbed for maximum strength and rigidity. The material is a close-grained alloy cast iron. The front guideway is of extra heavy design and is located directly over the supporting side of the bed, and as close to the point of application of power and to the point of pressure on the work as conditions if the work will allow. The rear guideway serves in an auxiliary capacity, but since both ways are very broad it is claimed that the lathe can take heavier cuts and produce finer finishes without chatter.

A further feature is the case hardened steel tool block mounted on the rear station of the compound cross slide. Having a range of longitudinal adjustments, it will take cut-off or form tools.

The redesigned Model 8A Lathe is made by The Wade Tool Co., 51 River St., Waltham 54, Mass. 27

#### PRUTTON CAM-ACTUATED TAPPING MACHINE

Pictured below is a recent addition to the line of automatic tapping machines manufactured by the D. H. Prutton Machinery & Tool Co. Designated the "Tapmaster No. 40", the new machine is designed to handle collapsible taps, ranging in size from  $1\frac{1}{2}$ " to 4", of the type



used in the tapping of gas cylinder caps and large pipe fittings.

The new "Tapmaster" embodies several new features, the most notable being that the taps are now actuated by a cam instead of a conventional lead screw.

## Buy KIPP AIR GRINDERS Because

The RPM's stay up while grinding ... not only when the grinder runs idle.

It is an established fact that surface speeds must stay up to approximately a mile a minute if you want to grind — not just rub. The speed of Kipp air grinders drops but slightly when put to work. That means better work—longer wheel life.

Buy Kipp air tools for best results, lower prices.

MODEL JA  
\$0,000 R. P. M.

**\$42<sup>00</sup>**

IN U. S. A.



Weight 12 ounces;  
length 6 $\frac{3}{4}$  inches;  
chuck size  $\frac{1}{8}$  inch.  
Wheel guard removed for better illustration.

**MADISON-KIPP CORP.**  
207 Waubesa St., Madison, Wis., U. S. A.

- Skilled in DIE CASTING Mechanics
- Experienced in LUBRICATION Engineering
- Originators of Really High Speed AIR TOOLS



**ASK YOUR VICTOR  
DISTRIBUTOR ABOUT**

### **the NEW molyflex High Speed Hand Hack Saw Blades**

Your Victor distributor will tell you that this new "Molyflex" . . . when pitted against eight leading competitive blades in cutting treated SAE 52100 ball bearing steel . . . *averaged 23.8% more metal cut* than all the leading brands tested. He will tell you that this new "Molyflex" . . . an addition to the Victor line . . . has greater uniformity, is absolutely shatter-proof and unbreakable when used in a frame.



### **VICTOR STEELRITE METAL MARKING CRAYONS**

Ask your Victor distributor about the new Victor Steelrite Metal Marking Crayons. Available in a variety of sizes, these crayons are made of genuine soapstone. Special extrusion process insures uniform strength and composition. Markings can be made on hot, cold, damp or grimy metal and withstand pickling, yet do not affect enamel application.

*Don't forget to ask for a free copy of the Victor Metal Cutting Booklet for your pocket or tool kit and the Victor Wall Chart for your shop. They'll help you get the maximum efficiency from your metal cutting saw blades.*



**SAW WORKS, INC., Middletown, N. Y., U. S. A.**

Makers of Hand and Power Hack Saw Blades,  
Frames and Band Saw Blades

This allows a rise after the tapping operation so that the facing or chamfering of the lower surface of the work can be accomplished by tools attached directly to the tap. In this way, the machining of the bottom surface, usually an operation in itself, is done during the tapping cycle.

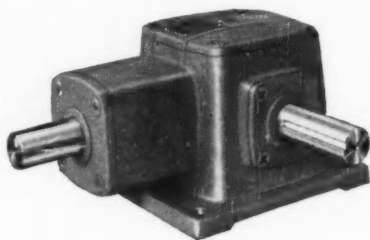
The use of collapsible taps in this type of work steps up production to 500 pieces per hour. The collapsible tap also eliminates the abrasions which occur on the chasers of solid taps during the threading out process.

Air fixtures for holding the work are custom made for each individual job. These fixtures clamp the work before the tap enters, hold it during the tapping and facing operations and release it when the work is done.

The "Tapmaster No. 40" is made by the D. H. Prutton Machinery & Tool Co., 5295 W. 130th St., Cleveland 11, Ohio. 28

### **OHIO GEAR INTRODUCES RIGHT ANGLE DRIVE UNIT**

A new stock right angle drive unit, designated RA-2, recently developed by the Ohio Gear Company, has special spiral bevel gears, case hardened and matched and lapped in pairs after hardening. Both input and output shafts are 1 1/4" in diameter and are mounted in precision tapered roller bearings. All shaft extensions have dirt and moisture repelling oil seals. The output shaft may extend to right or left or an optional through-shaft provides extensions to both right and left.



The capacity of these units is from 6 to 12 h.p., depending on the ratio. Available stock ratios are 1 to 1, 2 to 1, 3 to 1, 3 to 2, and 4 to 3. Other sizes are available on special order. The case is of high grade cast iron to insure strength and durability. Made by the Ohio Gear Co., Dept. 50, 1400 E. 179th St., Cleveland, Ohio. 29

### COMPOUND ANGLE VISE HAS WIDE APPLICATION

A compound Angle Vise which has equal use in grinding, milling and drilling operations at all angles has recently been announced. Any surface, it is claimed, may be finished to size by grinding when held in the unit. Tool bits, form and dado cutters may be formed and sharpened by placing the work in the angle vise and fixing the grinding surface in the desired position for grinding (see illustration).

The compound movement of the Compound Angle Vise makes it possible to mill all shapes. This is accomplished by securely clamping the base to the mill, and using the compound swivels to obtain the shape desired.

Holes may be drilled in unusual locations with accuracy, it is stated, by setting the Vise at the angle which will allow the drill to hit the surface at right angles. The new product should find adaptability in drilling oil and breather holes.

To convert the swivel vise to a straight drill vise it is only necessary to remove four Allen cap screws.

The vise will hold material up to



1½" x 2½". The slotted base size is 4" x 6". The overall height is 6". The unit swings 180° in either direction and is easily adjusted by socket head screws. It is made by En Fab, Inc., 338 Parsons St., Ka'amazoo, Mich. 30

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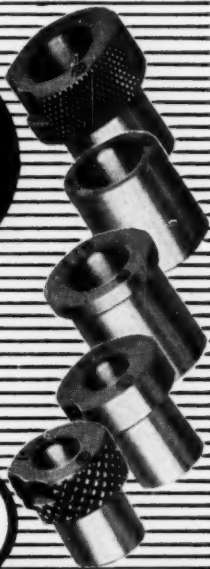


Accurate  
Interchangeable  
Concentric

## Acme Industrial Company

Makers of Hardened and Ground Precision Parts  
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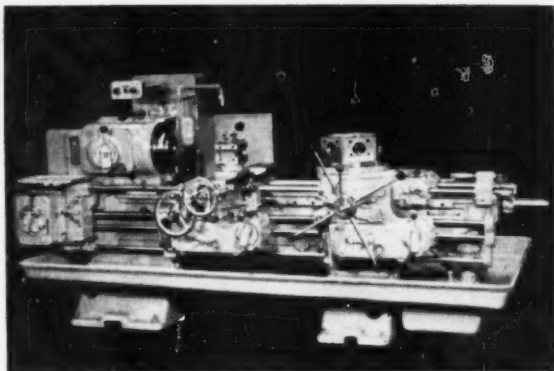


## NEW JONES & LAMSON SADDLE TYPE TURRET LATHE

The Jones & Lamson Machine Company announce their new Model 7A Saddle Type Universal Turret Lathe, with 2½ inch bar and 12 inch chuck capacity.

This completely redesigned model weighs over 4½ tons without tooling. It combines the construction and control features which were characteristic of the previous model, with improvements and refinements designed to provide the optimum in rapid, low cost, metal removal. The result is a rugged, versatile, easy to operate turret lathe that is setting new standards for fast metal removal combined with repetitive accuracy.

The new over-all functional design gives special consideration to the greatly accelerated developments in high surface speed metal removal. The design of the bed, in particular, emphasizes

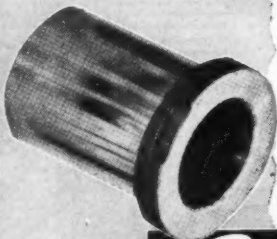


strength and rigidity, and provides for increased facility in chip disposal.

Threading to maximum turning length with carriage or saddle is made possible by a full length lead screw. An all-sliding-gear quick-change gear box with a single lever pitch selector, provides



## You're a Production Winner with **Economy** Drill-Jig Bushings and Gages



Yes, they're in stock, ready to go out to you — all A. S. A. standard types and sizes. You can also get fast service on new gages or gages salvaged by hard chromium plating . . . precision-finished, durable. Write for bulletin and price list.

# **Economy** TOOL & MACHINE CO.

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## starting from scratch

WITH MARSHALL PRECISION GROUND FLAT STOCK

The world's largest range of sizes of precision ground tool steel in three grades are available, ready for immediate shipment and the layout bench.

- ★ **WATERcrat:** A fine grained electric furnace high carbon tool steel. It has been wet ground to remove all bad surfaces and to assure velvet finish of virgin metal.
- ★ **OILcrat:** An outstanding product of careful handling assures you of a fine grained electric furnace oil hardening ground flat stock ready for the layout bench.
- ★ **AIRcrat:** This air-hardening tool steel shows less size change and offers a greater safety in hardening than either of the other grades. Dept. TB

Write for descriptive literature, catalog of sizes and prices.

**MARSHALL STEEL CO.**  
LA GRANGE, ILLINOIS  
The Aristocrats of Ground Tool Steel

a wide range of pitches. Both cross slide and saddle are equipped with power rapid traverse, and the turret is power indexed.

Two ranges of twelve spindle speeds, 20 to 1000 r.p.m. or 30 to 1500 r.p.m., are available, with a constant speed motor. Selection is made by a single lever speed selector. The Model 7A saddle type universal turret lathe is made by Jones & Lamson Machine Co., Springfield, Vt.

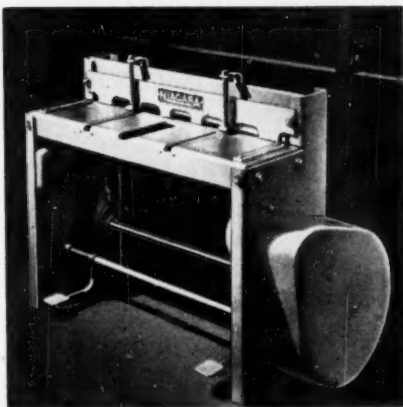
31

### NIAGARA LIGHT POWER SHEARS

A new line of high speed power shears for light gage sheet metal has recently been introduced by the Niagara Machine and Tool Works. These shears can operate continuously at 125 strokes per minute on mild steel up to 20 gauge in thickness, producing cuts that are straight and clean, the manufacturers state. Full visibility of the cutting edge through the arched openings and over the top of the holddown bar facilitate shearing to accurate layout lines.

The housings, bed, holddown and cross-head are fabricated from electrically welded steel plate which gives greater strength and rigidity as well as reduced

weight for portability. Carefully fitted bronze bearings and ways assure long life and dependable service. Axial air gap or "pancake" type motor is almost entirely concealed in the right hand up-



right making a compact, completely covered motor drive unit. Niagara Machine and Tool Works, Buffalo 11, N. Y.

32



**UNIVERSAL  
DRILL BUSHINGS**

Universal Drill Bushings with superhoned bores have been the first choice of industry since the founder of Universal Engineering Co. originated standard drill bushings nearly 30 years ago. Available in standard and special sizes to speed and simplify your jig drilling at greatly reduced tool breakage costs. Complete stock of standard bushings available for immediate shipment. Write today for complete information.

**UNIVERSAL ENGINEERING CO.  
FRANKENMUTH 10, MICHIGAN**

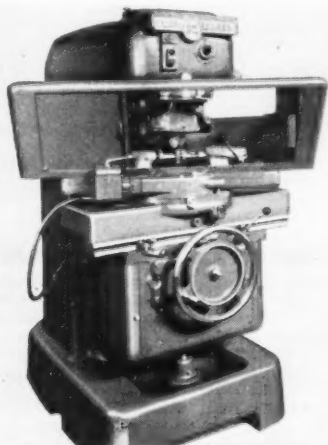
#### **NATIONAL BROACH INTRODUCES DIAGONAL GEAR LAPPING MACHINE**

Recent developments in gear tooth shaving have tended to stress the shaving operation. However, gear lapping still has a definite place in the manufacture of gears and especially as a salvaging operation. Some of the important techniques in the field of gear shaving have now been applied to gear lapping with spectacular results.

The principal one is diagonal feeding. Basically, it is similar to the technique used in diagonal shaving in that it eliminates the necessity for feeding the work into the lap during the machining cycle. Diagonal lapping which usually requires only two passes of the work through the lap (one forward and one back) is faster than conventional lapping and, also, makes it feasible to correct gear errors of greater magnitude than with conventional lapping.

Diagonal lapping will correct most of the eccentricity error and oversize gears can be brought to size without depending on the machine operator for size infeed control.

The diagonal method permits a crown to be produced on straight teeth during the lapping operation. Tapered teeth can be corrected.



Another development is the new hardened lap, specially heat treated to increase its service life.

The new Red Ring Diagonal Lapping Machine announced by National Broach

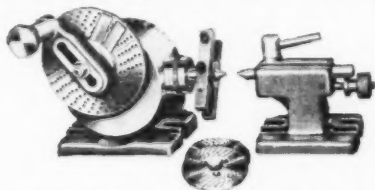
& Machine Company incorporates all these new ideas. By its use, gears may be lapped conventionally or diagonally with equal facility, according to the manufacturer. Conventional lapping may be selected for wide faced gears merely by locking the work table in line with its direction of reciprocal travel.

The principle of crossed axes lapping has been retained in the design of the new machine. Consequently, the lap head setting can be precisely positioned for any selected angle between work gear and lap axes. Lap speeds and table feed are mechanically controlled.

The subwork table is hinged to compensate for non-uniformity in gear size, to facilitate loading, to reduce operator fatigue, to maintain any predetermined pressure between lap and work, to compensate for lap wear and to speed production. Its action is air-operated and spring-loaded. The work gear is placed in loose mesh with the lap and the tail-stock clamped. Operating the air valve releases the subtable and allows the springs to raise it enough to force the work into close mesh with the lap. This also locks the table in lapping position and starts the machine. At the end of the lapping cycle, the air cylinder unlocks the table and lowers it so that the work may readily be unloaded. National Broach & Machine Co., 5600 St. Jean Ave., Detroit 13, Mich. 33

#### L-W UNIVERSAL DIVIDING HEAD

A 6½" Universal Dividing Head, precision built for extremely accurate operation has recently been introduced by the L-W Chuck Company. The head and tailstick of this unit are of sturdy construction in order to withstand the punishment which the device receives in daily use on small milling machines. The head spindle is provided with a tapered bearing; the head can be tilted to an angle of greater than 90° vertically.

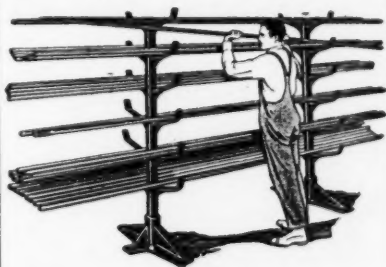


The Model SD Universal Dividing Head is provided complete with three index plates, permitting a total of 380 divisions. Made by L-W Chuck Co., 24 S. St. Clair St., Toledo 4, Ohio. 34



### HOW YOU CAN BOOST YOUR PROFITS

The BROWN TIME-SAVING RACK saves the time previously lost end-hauling each bar of stock its entire length from the old-style, closed-side Rack, the Brown Rack requiring but a few inches of side movement. Each length, width and thickness of stock is displayed in gold-fish visibility for instant selection. Workmen waiting for stock are served without waste of time, and returned to their production machines to turn out a maximum of output.



Any time you require additional storage space, all you need do is to add more units. If you want to relocate it at any time, you can do so quickly for it is unattached to the building. It is a simple, durable article made of metal in five styles. It can't burn, warp, sag or twist; depreciation is practically nil.

SEND FOR BULLETIN No. 26-B DESCRIBING THE BROWN TIME-SAVING RACK.

### BROWN ENGINEERING CO.

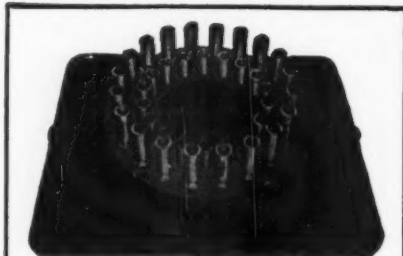
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RACKS • VISES • CLUTCHES • COUPLINGS



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**NEW METHOD STEEL STAMPS, Inc.**  
 149 Joseph Campau, Detroit 7, U.S.A.



*Pictured: a 38-Spindle Heavy-Duty Drill Head.*

**DESIGNERS AND  
 MANUFACTURERS OF  
 MULTIPLE DRILLING EQUIPMENT**

*We invite your inquiry.*

**MICHIGAN DRILL HEAD CO.**  
 971 E. 8 MILE ROAD HAZEL PARK, MICH.

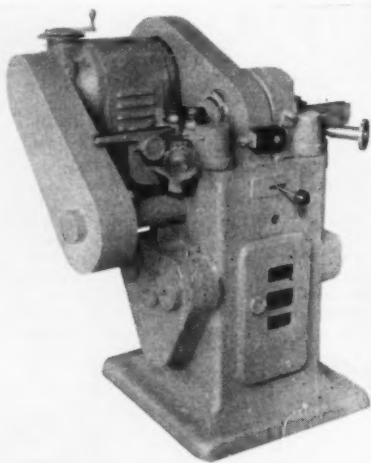
### HAWKER ROD AND DOWEL MACHINE

A completely redesigned rod and dowel machine, the new Hawker Model 1950, for turning dowels up to 2" diameter, is announced. Production rates of up to 200 lineal feet per minute—smoother finishes, and closed adherence to specified dimensions are among the advantages claimed for the new machine.

Faster production is attributed in part to the use of precision anti-friction bearings and pressure lubrication throughout the machine, which speeds operation and at the same time reduces power consumption. A U.S. Varidrive motor provides infinitely variable speed selection over the entire range and enables the operator to select the optimum speed for given stock quality, size and desired finish.

A new Carlyle-Johnson disk-type clutch has replaced the cone type clutch used on the original Hawker machines. The clutch is completely sealed in an oil bath, and requires an oil change only once every six months.

The new cutter head assembly employs precision cartridge type ball bearings, permanently sealed. The head is



adjusted by means of a geared ring, and settings are indicated on the rim of the ring for easy, positive adjustments.

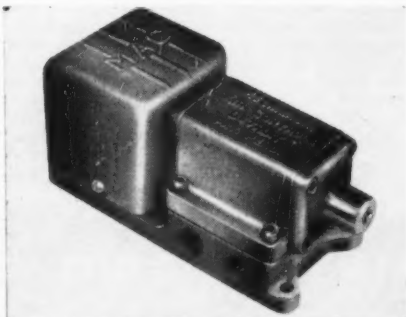
The cutter knives are of a special alloy, heat treated for maximum hardness and toughness. Repeated tests under actual shop conditions have shown that they last up to four times longer

between sharpenings than knives previously furnished by Hawker.

Feed rolls and stock guides also are redesigned for greater ruggedness and simplicity, and once adjusted for desired size of stock, feeding of stock is accurate and fast. A new descriptive catalog (No. 105) is available from the manufacturer, The Hawker Manufacturing Co., Dayton, Ohio. 35

#### TWO PRESSURE SOLENOID AIR VALVE

Mechanical Air Controls, Inc. announce the addition of a 4-way 5-port (two pressure) solenoid operated air valve. This "MAC" air valve features compactness of design, full orifice area, and simplicity of construction; it brings real economy in the operation of a double acting cylinder, the manufacturers claim.

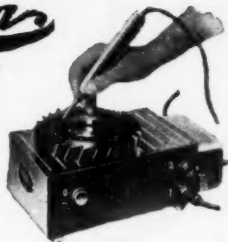


The two inlet ports allow full line pressure to be applied to the work stroke of an air cylinder and a much lower pressure to be applied to the return stroke, thus effecting a saving in compressed air. High or low pressure can be applied to either inlet port, and pressures can be reversed at the option of the operator. Pressure range is from 20 to 150 p.s.i., and the valve is available in  $\frac{3}{8}$ " and  $\frac{1}{2}$ " pipe sizes.

"MAC" patented "O" ring type seals give the "sealed with air pressure" feature of the poppet type valve, and yet maintain the ease of operation of the direct solenoid balanced type valve. The assembly consists of an iron base, bronze body with retainers, a solenoid with cover, and the chromed aluminum piston, which is the only moving part. All wearing surfaces are hard chromed to assure long life. Made by Mechanical Air Controls, Inc., 3049 E. Grand Blvd., Detroit 2, Mich. 36

#### MARK and DEMAGNETIZE IN ONE OPERATION

THE  
*Luma*  
WAY



The Luma combination etchtool and demagnetizer etches, demagnetizes, anneals and solders. Permanently marks hardest steel with ease of a pencil. Write for complete information.

**Luma Electric Equipment Co.**  
P. O. BOX 132-H TOLEDO, 1, OHIO

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**LAY-OUT AND  
IDENTIFICATION DYE**

**13 COLORS**

For Tool, Die, Pattern or Template layout on metal . . . Quick identification of bar stock, sheet, strips or parts . . . Shows up in sharp relief—dries instantly . . . Write for trial sample and circular.

**MICHIGAN CHROME &  
CHEMICAL COMPANY**

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Factory Package.  
Complete with No. 2  
M.T. Arbor and Key.  
\$12.00 Value. Prepaid  
if cash accompanies  
order  
for  
only **\$5.65**

### MILLING MACHINE ARBORS

51A12, Mfd. By Brown & Sharpe	\$29.40
41A12, Mfd. By Scully-Jones	24.90
50 7/8 A10	25.20
51 1/4 A12	31.20

### ADJUSTABLE ARBOR SPACERS (Dayton & Rogers)

1", 1 1/4" & 1 1/2" I.D.	ea. \$2.75
--------------------------	------------

### MILLING MACHINE ADAPTORS

No. 47 Mfd. By Scully-Jones	\$14.40
No. 49 Mfd. By Brown & Sharpe	14.40
No. 57 Mfd. By Brown & Sharpe	17.40
No. 59 Mfd. By Brown & Sharpe	18.60
No. 50-10 Mfd. By Brown & Sharpe	19.80
No. 54M Mfd. By Kearney & Trecker	22.50
No. 54M Mfd. By Scully-Jones	23.75
No. 50-40 Mfd. By Kearney & Trecker	18.75

### ALLEN WRENCHES

30,000 Genuine Allen Wrenches, 3/8"	
Hex for 1/2" cap screw or 3/4" Set Screw	
100	\$ 4.00
1,000	33.50
In lots of 10,000 or more	ea. 3c

### TAPER REAMERS

Large Assortment of Brown & Sharpe and Morse Taper Reamers. Mfd. by Cleveland, Union, Standard, etc.

**TAPER AND DOWEL PINS at 65% off list, Large Assortment.**

### SPECIAL

3/8 No. 1 Taper shank. H.S. Twist Drill.  
Mfd. by National. Per Doz. \$8.50  
Many other sizes Taper Shank H.S. Twist Drills. Up to 2" size at reduced price.  
Large Stock H.S. Milling Cutters, Stagger tooth and side milling cutters, at 30% off list.

Partial listing of our stock above, all priced to save you money. Our stock changes so fast it is impractical to issue listing. Send us a list of your needs for quotation. All inquiries and orders given prompt attention.

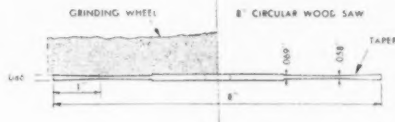
## MAIN SUPPLY CO.

521 Main Street, Kansas City, Mo.

## THOMPSON TRUFORM GRINDING MACHINE

A new Thompson Truforming Contour Grinder reduces grinding time on 8" circular wood saws from ten minutes to two and one half minutes. Formerly this job was performed on a circular single chuck grinder which required two operations and eight to ten minutes to complete a single 8" saw.

As shown in the accompanying diagram illustration, the grinding wheel



covers the entire saw area to be shallow-tapered; both grinding wheel and saw rotate in the grinding process. As can be noted, the outer edge of the saw is ground to .058" and in a one inch taper to .058" and then to .069", one and five eighths inches from the center. Thompson Truform Grinders for circular wood saws are available in 6 to 12 inches and 6 to 16 inches.

Crushing, truing and working cycles of operation are automatic with fully automatic pushbutton control. The ma-



chines are compact, with centralized control for easy operation. This new grinder, illustrated above, is one of a series of Thompson Truforming Machines devel-

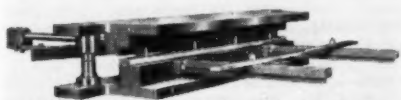
oped to reduce costs for a highly specialized operation. The principle of Truforming has proved highly adaptable where mass production of simple or intricate contours is necessary to meet rising costs. A previous example of the application of the Thompson Truforming principal was the Truformatic Contour Grinder capable of producing 4,000 lock parts per hour. Made by Thompson Grinder Co., Springfield, Ohio. 37

#### **SHEARING DIE FOR DIAMOND PUNCH PRESSES**

Diamond Machine Tool Company announces the manufacture of a die attachment to be used for shearing applications in a Diamond Model 3048 Multi-Max punch press. With the new attachment installed, the press can be used as a combination punch press and power squaring shear. With the shearing die attachment, Model 3048 Multi-Max punch press can be converted into a 10-gauge, 48" power squaring shear in approximately fifteen minutes.

The shearing die attachment is equipped with adjustable front and back gauges which are of identical design as used on Diamond power squaring

shears. Hold-downs are of one piece construction, stripper type spring loaded. Alloy steel blades are used, which have four cutting edges. Blades are heat treated and accurately ground. The shearing die attachment is mounted in an all-steel die set with two 2" diameter hardened and ground leader pins. The



cutting length is 48" and cutting thickness is 10 gauge. The slope per foot of blade is  $\frac{3}{8}$ " per foot. The back and front gauges have a maximum range of 24" each. The shearing die is made by Diamond Machine Tool Co., 3429 E. Olympic Blvd., Los Angeles 23, Calif. 38

## **FOR PERFECT ALIGNMENT**

**ON THE HEAVIEST JOB TRY**

## **ROOFE HEAVY-DUTY BULL NOSE CENTERS**

Two double rows of quality bearings in the large and small ends of the nose of this live center assure perfect alignment with any type of work.

Two shank sizes provide diameters from  $\frac{1}{2}$ " to  $7\frac{1}{2}$ " for a wide range of work with a single center.

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## **HOUSTON GRINDING & MFG. CO., INC.**

2110 QUITMAN STREET — HOUSTON 10, TEXAS.

*Reliable Distributors Wanted*



## PACEMAKER AUTOMATIC WHITEPRINTING MACHINE

The new Pease Whiteprinting equipment called the Pacemaker is an efficient and completely automatic reproduction machine designed for printing and developing ammonia vapor white prints continuously, in cut sheets or from rolls, at speeds ranging up to 32 feet per minute. It reproduces tracings, drawings, foil, film or anything typed, written or drawn on reasonably translucent paper.

This new unit accommodates all types and sizes of diazo materials up to 42" wide. The Pacemaker is simple to operate and easy to maintain. The few controls necessary are within easy reach of the operator. Automatic signal lights are provided to indicate various conditions in the functioning of the machine during its operation. A push button master switch controls all electric motors and heaters, instantaneously starting or stopping the entire mechanism.

The sliding revolving contact feature enables the operator to select either sliding-revolving contact or straight revolving contact at the flip of a lever, whichever is most desirable for the particular type and sizes of tracings or material being reproduced.

A new type interlocking roller de-

veloper makes it possible to develop all types of diazo materials without stick-



ing, scratching or wrinkling. It also prevents prints from becoming lost in the developer or emerging dog-eared or dis-

## EISLER TRANSFORMERS

For Every Class of Service  
STANDARD AND SPECIAL



We manufacture all types of transformers, sizes from 1/4 to 500 KVA. Air, oil, or water cooled for distribution, lighting, welding, furnace, phase changing rectifiers, auto, etc.

Special transformers built to Customers Specifications.

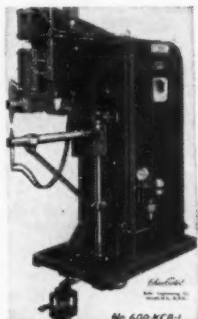
EISLER Transformers conform strictly to NEMA, ASA and AIEE standards.



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For all types of welding in sizes: 1/4 to 300 KVA. Foot, air or motor operated.

We invite contract spot or butt welding in large or small quantities.



Air operated Press Type Spot Welders (made from 5 to 250 KVA)

**EISLER ENGINEERING CO., INC.**  
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Chas. Eisler, Pres.  
Newark 3, N. J.

torted. The assembly's design keeps the prints completely exposed to ammonia vapors to insure full development at maximum production speeds. Tracking of the developer band is controlled automatically, thus freeing the operator of any attention to this unit whatsoever.

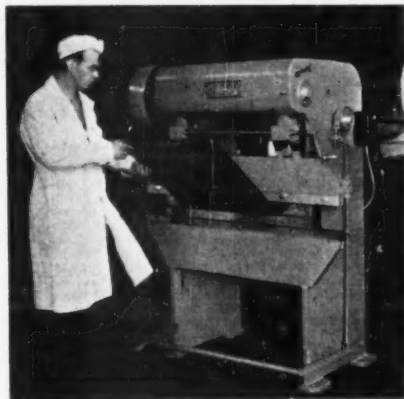
Separation of the tracings or original copy from the sensitized material is an automatic operation with the Pacemaker. Exposed prints are automatically conveyed into the developer while the tracing or original copy is returned to the operator for additional feedings.

Instantaneous speed control is another new feature of the Whiteprinter. A conveniently located speed control lever gives the operator positive control. He can quickly select or adjust the mechanical speed of the machine for properly exposing tracings or other copy.

The Pacemaker operates on wiring of 200 to 250 volts, 60 cycle single phase a.c. with a starting current of 32 amperes and running current of 48 amperes or a kilowatt load of 9.6. The net weight is approximately 2500 lbs. The extreme width is 7'-6" and height is 7'. Extreme depth with the feed table is 4'-5½". Made by The C. F. Pease Co., 2601 W. Irving Park, Chicago, Ill. 39

#### VERSON SMALL POWER PRESS BRAKE

Designed to replace hand press brakes and to eliminate the need for tying up big machines on small odd jobs, a new

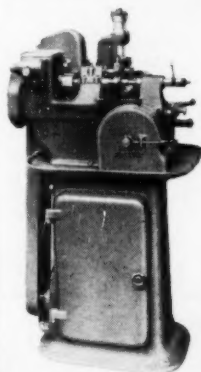


power press brake has been developed by the Verson Allsteel Press Co. This new unit designated as the Verson 16-48, has a bed and ram length of 48". It is

## LAMBERT

### Increase Gear Production! LAMBERT M75 STEPS UP PRODUCTION 50%

Ideal for the manufacture of precision gears with diameters from .07874 to 3.46456 inches (2 to 88 MM).



- STRAIGHT TEETH GEARS
- HELICAL GEARS up to 18° R.H. or L.H.
- WORM WHEELS (cut radially) and with available special attachment
- BEVEL GEARS, straight teeth

Automatic radial and longitudinal feed, combined in the M75, effect a shortened approach stroke . . . increasing productive capacity as much as 50 per cent!



Write for data on Model 75 and other Lambert gear hobbing machines.

**LAMBERT DIVISION**  
**HAUSER**  
**MACHINE TOOL CORP.**  
MANHASSET, N. Y.

suitable for most types of metal forming ordinarily performed on press brakes. Rated air bending capacities range from a 48" length of 16-gauge stock (over a  $\frac{1}{2}$ " opening) to a 24" length of 10 gauge stock (over a  $1\frac{1}{8}$ " opening).

The 16-48 is unusual among smaller machines in that unit all steel construction is employed to assure perfect alignment and maximum rigidity. All gears are steel with machine cut teeth. Eccentric and intermediate shafts are mounted in solid renewable bronze bushings. Totally enclosed friction clutch and self releasing band brake are employed. Ale-mite hand fittings are provided for convenient lubrication. A variable speed arrangement provides 20 to 50 strokes per minute operation. Where portability is required, the 16-48 may be mounted on casters.

Made by Verson Allsteel Press Co., 9303 S. Kenwood Ave., Chicago 19, Ill. 40

#### NEW PLASTIC FOR CHECKING MACHINED FINISHES

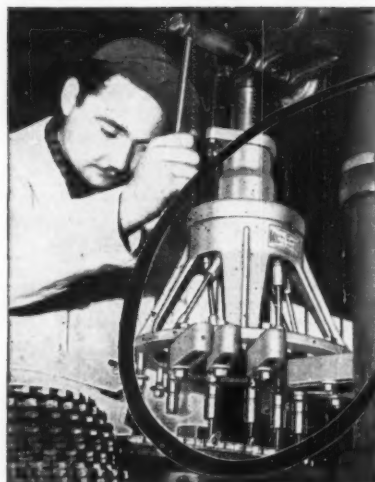
An effective method for checking new or worn machined surfaces of various mechanical parts such as gears, boiler tubes, bearings, valve facings or seats,

flanges, cylinder liners, etc. has been developed by Marco Chemicals Inc., in cooperation with the Naval Boiler and Turbine Laboratory, U. S. Naval Shipyard, Philadelphia, Pa.

The new method involves the use of a liquid casting plastic which is supplied in kits (Marcokit No. 249) by Marco Chemicals Inc. Each kit contains a pint of casting resin and the proper amount of catalyst which, when combined with the resin, will cause it to solidify in approximately 15 minutes. The catalyzed plastic resin is simply poured against the surface to be checked and removed when hard. It provides an accurate and permanent record, faithfully reflecting the surface conditions of the machined piece. For surfaces where the liquid resin would run off, Scotch tape is used to form mold walls and contain it until solidified.

The color of the casting resin is green, since it has been found that surface variations are more easily detected against the colored background. This resin is said to be so sensitive that the castings will even show fingerprints that have been left on highly polished surfaces. It is made by Marco Chemicals, Inc., Sewaren, N. J. 41

## MULTIPLE DRILLING with a . . .



### MULTI-DRILL

Increases Capacity  
Up to 800%

ADJUSTABLE TO ANY HOLE PATTERN  
FITS ANY DRILL PRESS

If your production requires drilling from 2 to 8 holes in a work piece, a MULTI-DRILL will cut costs and speed output up to 800%. The MULTI-DRILL is universally adjustable to any hole pattern — is compactly built to permit easy, unhampered operation with drill jigs or other special fixtures. Ruggedly built to take the wear and tear of high production work, the MULTI-DRILL will handle your long and short run multiple drilling jobs with ease and economy. The MULTI-DRILL will drill on hole centers as close as  $\frac{1}{4}$ " — handle drill sizes up to  $\frac{1}{2}$ " in steel. Special adaptations available.

There is a Commander MULTI-DRILL Distributor in your area. Write for his name, literature and complete details.

**COMMANDER MFG. CO.**

4227 West Kinzie St.

Chicago 24, Illinois

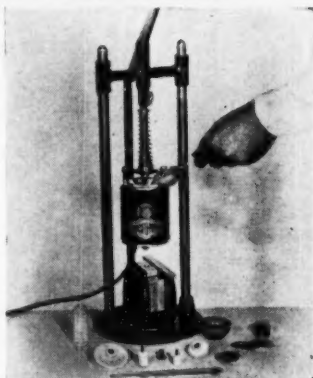
Product of *Commander* — Builder of the *Commander Tapper*

### SMALL, HEAVY DUTY THERMOPLASTICS MOLDING PRESS

A 1/4 oz. capacity, hand operated injection molding press for thermoplastics is now available. Called Plast-O-Press, the unit is sturdily built for heavy duty. It operates on 110-125 V., a.c. or d.c. and molds any thermoplastic moldable between 250° and 500°F. The press can be chucked into any drill press or used with an arbor press specially designed for it.

Users report that Plast-O-Press is well adapted to and satisfactory for experimental, test, sample, and short-run molding of plastic component parts or end products within its capacity at substantial savings over previous methods of doing the same work. The simple hand operation of the press requires no training or experience to turn out better than one molded piece per minute.

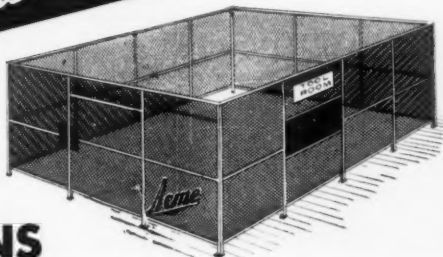
The Plast-O-Press has a thermostatically controlled heating element built around a 1/4 oz. capacity cylinder in which molding materials are heated to flow point. The downward thrust of the arbor press (or drill press) brings the unit's nozzle to the mold opening and,



in the same motion, drives a piston into the cylinder to force the plastic material in the mold cavity. The unit has a three-inch stroke, is ten inches high and weighs two pounds. It is made by **Plastics Development Corporation, 225 Lafayette St., New York 12, N. Y.** 42

*Leaders for 50 Years*  
**1899-1949**

## TOOL CRIBS and PARTITIONS



**Standard Sections Woven Wire Mesh Panels and  
Doors to enclose Tool Crib, Stock rooms and other  
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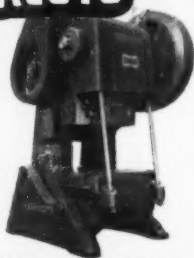
**IMMEDIATE DELIVERY**

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**Acme Wire & Iron Works**  
3519 E. Canfield — Detroit 7, Mich.



# FERRACUTE



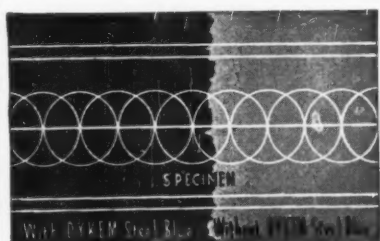
NEW DESIGN  
OPEN-BACK

## INCLINABLE PRESSES

32 to 150  
tons

*Send for new broadside giving  
complete description.*

FERRACUTE MACHINE CO. Bridgeton, N.J.



### DYKEM STEEL BLUE STOPS LOSSES making dies & templates

Simply brush on, right at the bench; ready for the layout in a few minutes. The dark blue background makes the scribed layout lines show up in sharp relief, and at the same time prevents metal glare. Increases efficiency and accuracy.

*Write for full information.*

### THE DYKEM COMPANY

2301G North 11th St., St. Louis, Mo.  
In Canada: 2488 Dundas St. West, Toronto, Ont

### BOICE-CRANE CONTOUR SAWING AND FILING MACHINE

A new, all-purpose combination contour saw and band filer is announced by Boice-Crane Company. It is claimed to permit large time savings over milling, shaping and hand-filing methods, sometimes as much as 90%, in cutting, filing and file broaching on small run production parts and maintenance parts; irregular shaped stacked parts; spiral parts, tools, templates and stamping, forming and trimming dies.



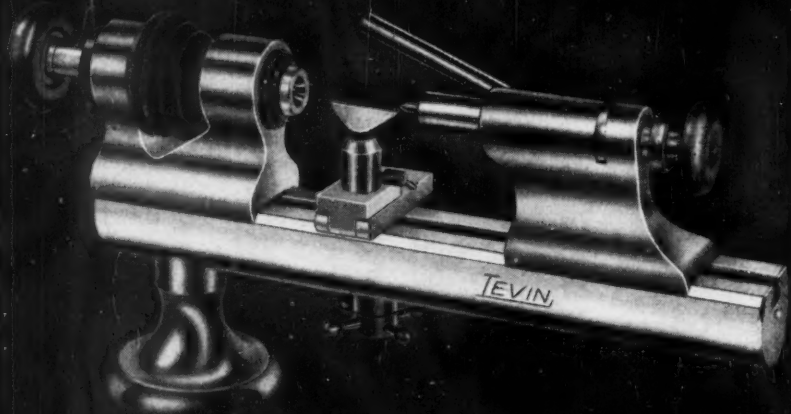
The machine is a portable, general purpose saw-band filer, a compact, accurate unit suited to the needs of tool and die shops, laboratories, machine shops, millwrighting and repair shops etc.

Precision filing and file broaching to a layout finish line and flash removal are accomplished in one-ninth the time of hand methods and one-fourth the time of reciprocating filing machines, according to the Boice-Crane Co. An accurate scale eliminates all guess-work from angle filing.

The unit is provided with speeds of up to 4100 blade f.p.m. for cutting wood and other non-metallic industrial materials, and speeds ranging down to 92 blade f.p.m. for cutting tool, bar and sheet steel, brass, cast iron and bronze, and for filing a variety of metals. A quick-change ball-bearing-equipped gear box and step pulleys make any one of eight speeds avail-

DELICATE WORK

REQUIRES A SENSITIVE LATHE



The ideal lathe for small parts. Turns out work faster... produces finer finish... costs less to operate.

\* Precision pre-loaded ball bearing spindle \*

Bed 12" long \* Center height 2" \* Collet capacity

either 5/16" or 3/16" \* Complete line of accessories

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CARRY THIS TRADEMARK

LOUIS LEVIN & SON, INC. DEPT. M  
782 E. PICO BLVD., LOS ANGELES 21.

able. Rapid filing and flat work are always assured by the rigidity of the hardened steel file guide and backer-up (patent applied for) which is supported above and below the table. Precision machine cut helical gears run in a constant bath of oil.

The frame is of 10-gauge solid welded steel, heavy and rigid. The 15"x15" heavy ribbed cast work table, ground to close machine tools limits, is mounted on two heavy cast trunnions, designed to simplify and speed up the insertion and removal of blades through a front, rather than a side, table slit.

The Textolite disc wheels are mounted on sealed-for-life ball bearings, machine balanced for speeds in excess of 1200 r.p.m. (4100 blade f.p.m.) and carry crowned, cemented replaceable tires of live rubber.

Modern, high-speed production techniques of "inside" contour sawing, which eliminate broaching, are made possible by including an automatic electric blade butt welder.

This new machine is made by Boice-Crane Co., 936 Central Ave., Toledo 6, Ohio.

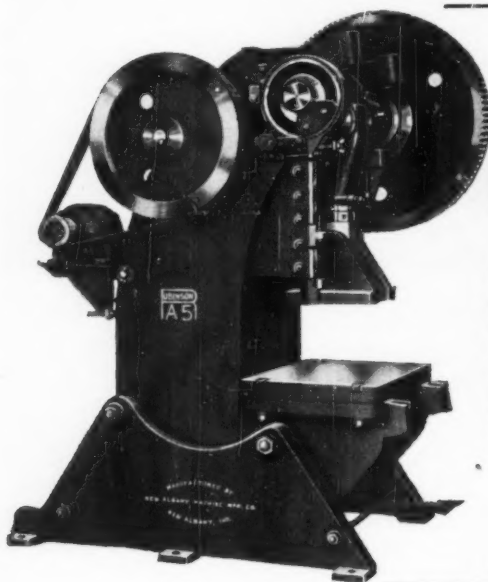
43

## TORQUE INDICATING STUD DRIVER

To increase production and maintain uniform torque in driving studs, a power driven, torque indicating stud driver has been developed by Industrial Engineering Company. Capable of driving right or left hand studs up to  $\frac{1}{2}$ "-13 threads, the driver can be used on any drill press, air motor or electric drill. Any torque desired can be maintained.

As a stud is driven, the operator watches two small signal lights on the front of the stud driver. A green light will glow until the pre-determined torque has been attained, at which time the light goes off and the stud is properly set. Should the stud be driven too tightly a red light will glow. The range between the green light (too loose) and the red light (too tight) is adjustable and is set by a knurled screw. A calibrated torque wrench attached to the stud driver is used as a standard. During the driving operation the torque wrench indicates the torque being used to drive the stud.

There are no frictions or other "guess work" parts in the indicating portions of the tool. Positive gears are used. For ease of operation a reversible clutch is



### INCLINABLE PUNCH PRESSES SERIES A

# R

## OBINSON

A-5 Motor Drive 88 Ton Geared Inclinable Punch Press with Anti-Backlash Brake to take care of kick back when using air cushion and heavy spring pressure pads. Timken bearings in clutch wheel and back shaft bearings. Available in 14, 22, 32, 56 and 88 ton capacity. Literature on request.

**New Albany Machine  
Mfg. Co.**

**New Albany,**

**Ind.**

built into the driver in such a way that the conventional stop on the drill press may be set to drive the studs to the correct height automatically.

Uses for the tool include power tightening of cap screws, nuts etc. to a predetermined torque.

The Industrial Engineering Company,  
730 E. Sample St., South Bend 18, Ind. 44

### COVEL PRECISION BORING MACHINE

Covel Precision Boring Machines for accurate, high production, boring, turning and facing, feature new type controls permitting instant selection of any one of three automatic cycles and convenient "inching" control for setting up. Electro-Hydraulic Controls offer quicker response to table and tooling movements, speeding up machine output.

In addition to control versatility, all push button stations are grouped in one inclined panel for easier reach and vision of operator. Cartridge-type spindles have permanently lubricated, preloaded bearings. Ways are provided with automatic lubrication and spindle motors are mounted above for convenient maintenance and shorter, efficient "V" belt drives.



Covel Precision Boring Machines are available in several models of both single and double end types. The No. 51 single end model is illustrated above.

Special as well as standard applications can be furnished for single or multiple operation requirements. Made by Covel Manufacturing Co., Benton Harbor, Michigan. 45

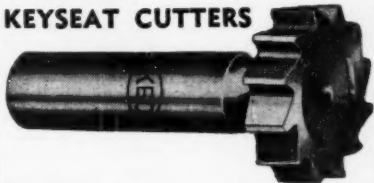


## CENTER DRILLS



Made of finest high speed steel. Available in all standard sizes. Always in stock for immediate delivery. Specials made to your specifications.

## KEYSEAT CUTTERS



High speed. Right hand.  $\frac{1}{2}$ " shank. Diameter from  $\frac{1}{4}$ " to  $1\frac{1}{2}$ ". Standard sizes in stock for immediate delivery. Complete set—41 sizes—available in sturdy, hardwood box. Saves time and money, because you always have the size you need.



## CENTER REAMERS

High speed steel. Reamers from  $\frac{1}{4}$ " to 1" regularly furnished with 60°, 82°, 90° included angle. Specials made to your specifications.

## LATHE MANDRELS



Precision made of tool steel, hardened and accurately ground. Tapered .0005" to the inch. Mandrels from  $\frac{8}{16}$ " to 1" are .0005" undersize at small end, from  $\frac{1}{4}$ " to 3", .001" undersize. Immediate delivery.

### Write for Literature

Illustrated literature and prices on all KEO Products mailed on request.

## KEO CUTTERS

19326 Woodward - Detroit 3 Mich.

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### GREAVES-SILENT BAKELITE GEARS



No waiting when you order Greaves Silent Bakelite Gears. • We have them in stock NOW! • Your order will go forward immediately. • You'll appreciate the silent operation and added smoothness provided by Greaves Silent Bakelite Gears. • You'll marvel at their great strength to carry big power loads... their remarkable ability to successfully operate completely submerged in water. • You'll welcome their low cost. • No metal reinforcements required. • Save Time... Money... Labor!

*We also make silent gears of rawhide and Fabrol.*

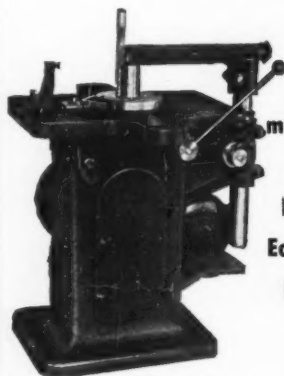
Write for Circular.



**Greaves MACHINE TOOL CO.**

2013-18 Eastern Ave.  
Cincinnati, Ohio

## "DAVIS" KEYSEATERS



are  
moderately  
priced  
Efficient  
Economical  
Durable

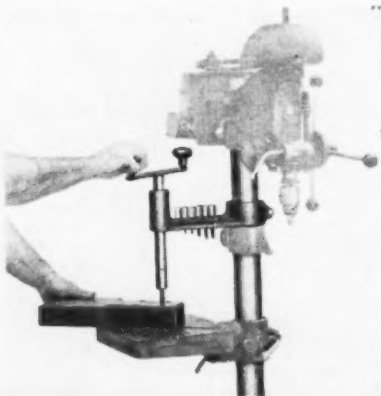
Built in 3 sizes for cutting keyways 1/16" to 1 1/4" width. Circular upon request.

**DAVIS KEYSEATER CO.**

407 1/2 Exchange St. Rochester 8, N. Y.

## PARAGON PRECISION HAND TAPPING MACHINE

Paragon Metal Products has recently announced a new Hand Tapping Machine designed to eliminate tap breakage and speed up tapping in the tool room and die shop.



This precision Hand Tapper is complete, ready to use and can be mounted on the drill press column as a permanent fixture in just a few minutes. The drilling machine continues to serve not only as a drill press but also as an "always ready for use" precision tapping machine.

By utilizing the drill press' table and column, a Precision Tapping Machine having the following features is obtained: —adjustable 'tap to table' clearance from 0 to 48"; a long 3 1/2" spindle guide bearing to assure correct angle tapping at all times; full 7 1/2" depth of throat, and ready mounting facilities.

The Paragon Precision Tapping Machine comes equipped with seven quick-change tap adapters in sizes 8-32, 10-24, 1/4", 5/16", 3/8", 7/16", 1/2". Made by Paragon Metal Products, 416 S. Broadway, Los Angeles 13, Calif. 46

## RAYON HYDRAULIC HOSE ASSEMBLIES

New high-pressure two-braid rayon assemblies with pressed-on couplings are announced by J. N. Fauver Co., Inc. These devices are available with any combination of male and female solid or union couplings, in sizes 1/4" to 1" inside diameter. They are identified as Type RR-2 Rayon Braid Hose. The hose is constructed of a synthetic core, two-ply braided rayon cords and a neoprene

cover, with a burst pressure of 2400 to 6000 p.s.i., dependent upon the diameter. It provides a highly flexible conductor and hose assembly that can be used for most applications where wire assemblies have been used. On hydraulic circuits for

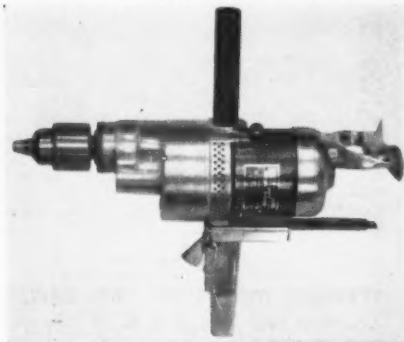


welding, or any installations where electricity is involved, this two-ply braided rayon hose and neoprene cover, without any metal braid, eliminates the hazard of shorting. Made by J. N. Fauver Co., Inc., 49 West Hancock Ave., Detroit 1, Mich.

47

#### TWO-SPEED PIONEER ELECTRIC DRILL

The new Pioneer two-speed electric drill has been designed for high and low speed work in steel or hardwood. It is provided with a gear shift arrangement which extends the use of the drill from  $\frac{1}{4}$ " to  $\frac{5}{8}$ " in steel, and  $\frac{1}{4}$ " to  $1\frac{1}{4}$ " in hardwood. With three drill settings (high-neutral-low), the operator is able to shift



quickly from neutral to low to high while the motor is operating, eliminating the possibility of stripping gears. The speed of the unit in the power range is 460 r.p.m., and in the fast range, 880 r.p.m. The new dual speed drill is powered with a universal motor. The unit is manufactured by the Louisville Electric Manufacturing Co., Louisville, Ky.

48

**WET or DRY**

**CARBIDE TOOL GRINDERS**



HAMMOND Carbide Tool Grinders will soon pay for themselves through greater wheel economy, longer tool life and faster grinding.

AMERICA'S MOST COMPLETE LINE.

6", 7", 10", 14" Wet or Dry—also Chip Breaker and Diamond Finishing Grinders.

WRITE FOR CATALOG 220

Model WD-10 Wet or Dry 10" Carbide Tool Grinder.

*Hammond Machinery Builders*

1614 Douglas Avenue      Kalamazoo, Michigan

# NIELSEN

## Heavy Duty

### Live Centers

Adapted for heavy duty work. Precision type ball and roller bearings assure maximum capacity for high speed production and long service.



Write for catalog on live centers

**NIELSEN, INC.      LAWTON, MICH.**



*Fast but accurate*



**Littell  
ROLL  
FEEDS**

Style "M"

Simplify work for your die setters and press operators. Get easy-to-install Style "M" Roll Feeds. All the features of higher priced feeds. Positive, silent roller drive

gives high speed with exceptional accuracy. One of many fine Littell pressroom machines.

REQUEST BULLETIN

**F. J. LITTELL MACHINE CO.**  
14153 RAVENSWOOD AVE., CHICAGO 13, ILL.

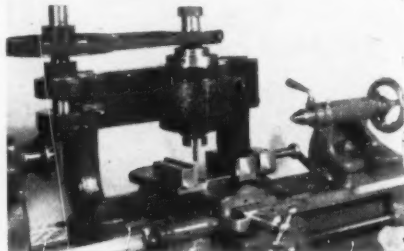


#### SMALL VERTICAL MILLING MACHINE

C. G. Forsman Co., manufacturers of metal specialties, have recently placed on the market a small Vertical Milling Machine, designed especially for the small experimental or die shop where space may be limited.

The new unit will attach to any 9" or 10" lathe, and is driven by the lathe head. The speed of the vertical spindle is double that of the lathe. Ball bearings are used throughout the machine. A draw tube for standard collets is provided for holding straight shank cutters. The inside taper is the No. 3 Morse.

The work is held in a swivel vise which is mounted on top of the lathe cross slide. The maximum clearance under spindle on a 9" lathe is 3 1/4". The horizontal travel of the vise is 5"x 6". The vertical travel of the spindle is 2" Vibration is minimized by the heavy construction of two supports that are clamped direct to the lathe bed on each side of



the carriage. The illustration above shows the Vertical Milling Machine mounted on a 9" South Bend lathe.

The manufacturers state that the unit is a useful machine for precision tool work. It can also handle long shafts for keyway milling, squared surfaces, and similar operations. Made by C. G. Forsman Co., 914 Elliott St., S. E., Grand Rapids 7, Michigan.

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#### STANDARD WET OR DRY TOOL GRINDER

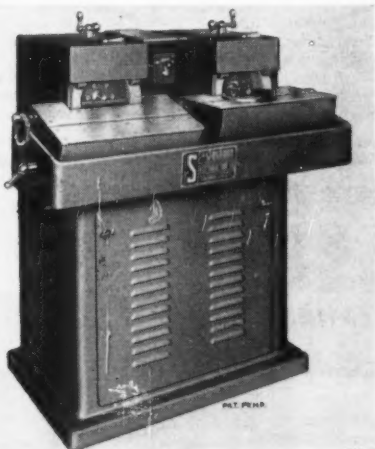
A new twin-wheel Wet or Dry Tool Grinder for Carbide, Stellite and high speed steel tools has been designed for operator comfort, visibility and convenience. Just one step takes the operator from roughing to finishing wheel. It is convenient for one or two operators and saves steps for one operator. It conserves floor space, as the grinder may be located against the wall.

The degree-graduated independent tilt-

ing tables are stationary, with table supports integral with the splash pan and base. Table tops have renewable steel wear plates. Convenient machine handles are provided for tilting the tables, 15° above to 30° below the horizontal. Each table has a safety lip to prevent tools dropping into the wheel recess.

Grinding spindles and coolant pump are V-belt motor driven and fully enclosed. Each grinding spindle is mounted in three precision ball bearings. Quick-acting latches on the large louvred front cover give quick access to the motor, V-belt drive, pump, coolant reservoir, settling chamber and drain. V-belts are instantly renewable without any dismantling.

Crank handles are at the top for independent wheel adjustment. A slight turn of the crank handle will bring the wheel forward for minimum table clearance. The crank handle moves splined spindle quill in housing.



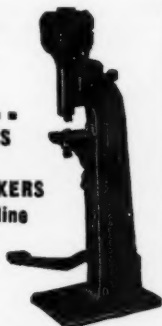
A reversing control switch, two removable covers for access to all parts and equipment, protractor tool guide with diamond holder, resilient tray for tools and honing stone, and built-in exhaust outlets for dry grinding, are included as standard equipment.

The Type 10TD with 1½ h.p. motor is for two 10" plate mounted cup wheels; the Type 14TD with 3 h.p. motor, for two 14" plate mounted cup wheels. Made by The Standard Electrical Tool Co., 2486 River Road, Cincinnati 4, Ohio. 50

# GRANT

## RIVETERS...

**PIONEERS  
and  
PACEMAKERS  
in their line**



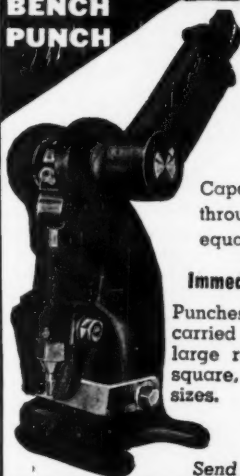
—head rivets from smallest to ¾" diameter either by NOISELESS SPINNING or VIBRATING HAMMER method—Sizes to meet all needs—types include Vertical and Horizontal Multiple Spindles.

Write for literature and don't forget to send samples.

**THE GRANT MFG. & MACHINE CO.**  
C E Station, Bridgeport 5, Conn.

## FRONT LEVER BENCH PUNCH

**STURDY  
•  
DURABLE  
•  
HANDY**



Capacity: ⅞" hole through ¼" steel or equal.

**Immediate shipment.**

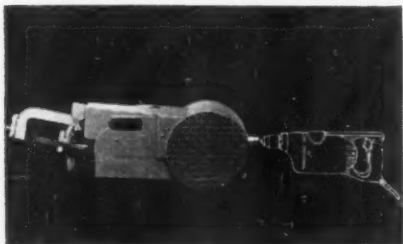
Punches and dies are carried in stock in a large range of round, square, flat, and oval sizes.

Send for Circular.

**T. H. LEWTHWAITE MACHINE CO.**  
312 East 47th Street New York 17, N. Y.

### HACK SAW, POWERED BY ELECTRIC DRILL

This new power hack saw is operated by any standard electric drill. It weighs only 21 lbs. (not including drill), and uses a standard 10" hack saw blade. It has a 5" stroke. The overall length of the unit (not including drill) is 26". The



hack saw attains a speed of 200 strokes per minute when the drill speed is 1240 r.p.m. The saw will cut pipe or metals up to 2" in diameter from two to ten times faster than hand sawing, according to the manufacturers.

All moving parts are protected by safety guards and are accessible by simply lifting the hood.

The saw employs a rotary motion and

will not catch nor bind. As the blade is held rigidly in position, the cuts are said to be extremely true.

For general shop use, the saw may be fastened in a bench vise. For overhead pipes, metals in awkward or hard-to-reach places, or for pieces too large or too heavy to be taken to the bench, the new saw can be easily carried to the job and there clamped to the work. The unit operates equally well upside down or at an angle. The power hack saw is made by **Zina Goodell Corporation**, Salem, Mass. 51

### NEW COMPACT MACHINISTS' VISE

The Parma Manufacturing Company announces the new, Low-Boy Machinists' Vise which is being offered in two sizes.

The unit is built without T slots and bolt holes, thus the inside of the vise is kept free of chips and dirt. The manufacturer claims this feature saves swiveling and clamping time. The improved design, low and compact, provides extra clearance between table and cutting tool, adds strength and eliminates breakage, it is stated. A new lock-plate for the swivel permits a locking area of 360°, clamps the vise more rigidly, with less

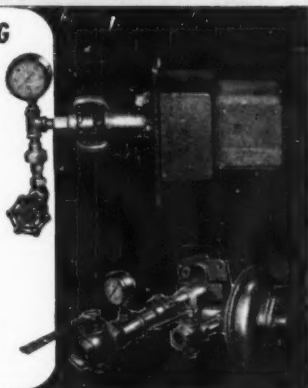
## 'Surface' AUTOMATIC PROPORTIONING GAS BURNERS.

### ECONOMY • EFFICIENCY • RAPID HEATING

Surface Combustion Automatic Proportioning Combustion Systems consist of two parts:—

- 1 An inspirator which mixes fuel and all air required in correct proportions over the entire operating range.
- 2 The burner or burners which facilitate complete combustion in properly sized combustion tunnel with rapid heat release.

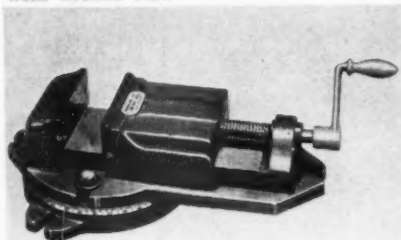
Surface Combustion Automatic Proportioning Equipment is available for either of two methods of mixing—high pressure in which kinetic energy of the gas entrains the air—low pressure in which the kinetic energy of the air entrains the gas. Entire combustion systems can be installed as an integral part of the furnace or appliance. Write today for Complete Specifications 2GP-8, 2GE-8.



**SURFACE COMBUSTION CORPORATION • TOLEDO 1, OHIO**

pressure and eliminates time previously required to work T bolts around in chip-filled slots.

The Low-Boy is precision made, with hardened and ground steel jaws, a drop forged crank and a large Acme screw with bronze nut.



The Model P-2 has a height of 5" with base (3 $\frac{3}{4}$ " without base), a jaw height of 1-15/16", jaw width of 5 $\frac{1}{4}$ ", opening with jaws 4 $\frac{3}{4}$ " (without jaws 5 $\frac{3}{4}$ "), weight 65 lbs. The Model P-1 has a height of 4" with base (2 $\frac{3}{4}$ " without base), a jaw height of 1 $\frac{5}{8}$ ", jaw width of 4 $\frac{1}{2}$ ", opening with jaws 3 $\frac{3}{4}$ ", (without jaws 4"), weight 35 pounds. Made by Parma Manufacturing Co., Parma, Mich.

52

## KELLER HIGH-SPEED GRINDER

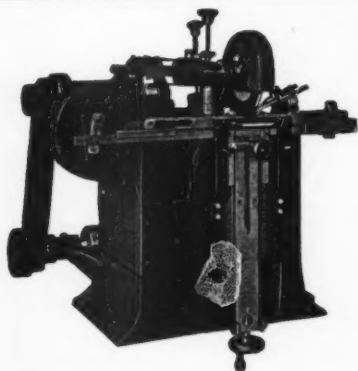
A new 15-ounce pneumatic grinder for the operation of grinding wheels of  $\frac{1}{2}$ " diameter and smaller is announced by Keller Tool Company.

The compact construction of the Model 30A-7 Keller High-Speed Grinder makes it an easy-to-handle tool for grinding in close quarters, or where intricate designs permit only the use of very small grinding wheels. It is useful for touching up dies and similar tedious jobs which occur in general tool-room work.

The grinder has a speed of 75,000 r.p.m. The housing is built along smooth-flowing lines and fits comfortably in the hand.

An inverted throttle lever provides a convenient operating control. The standard spindle collet accommodates mounted grinding wheels with  $\frac{1}{8}$ " diameter shanks. Optional equipment includes spindles with 3/16" or 1/4" capacity collet chucks. Made by Keller Tool Co., Grand Haven, Mich.

53



### Pays For Itself On A Single Gross Of Blades!

New hack saw blades are usually NOT ground after hardening. That is why blades resharpened on Wardwell EC Grinder will be sharper-than-new. Blades can be resharpened at least 6 times on the average.

## ONE MACHINE SHARPENS HACK, CIRCULAR AND BAND SAWS

Wardwell Model EC Combination Grinder is the only single-unit grinder adaptable for hack, band and circular saws that does not depend on the shape of the grinding wheel to form the shape of the tooth. This unique feature enables operator to grind a variety of blades without dressing or changing wheels.

Write For WARDWELL EC COMBINATION GRINDER BULLETIN

**THE WARDWELL MANUFACTURING CO.**  
3165 Fulton Rd. Cleveland 9, Ohio

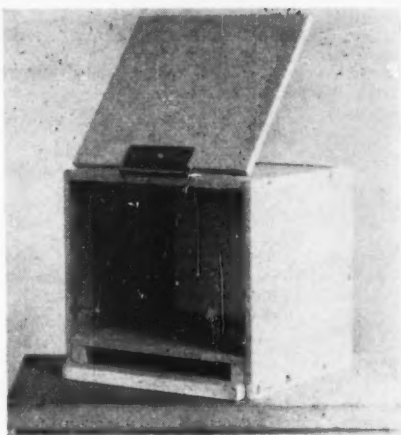
## ASBESTOS HEATING BOXES WITHSTAND 800° FLAME

An asbestos heating box of wide potential use has recently been introduced. The boxes are made in three sizes, 6" square, 8" square and 10" square; these dimensions are all inside measurements.

The sides and top of the box are made of an asbestos composition,  $\frac{1}{4}$ " thick, and the bottom and back are  $\frac{1}{2}$ " thick. This material is stated to be able to withstand direct flame at from 800° to 1000° F. There are two loose supports, each  $\frac{1}{2}$ " square and a section of  $\frac{1}{4}$ " material which fits on top of the supports. A piece of cold rolled steel  $\frac{1}{4}$ " thick fits on top of the supports and can be used for holding material. In such cases, the asbestos  $\frac{1}{4}$ " base is removed, permitting an air space under the  $\frac{1}{4}$ " metal.

It is claimed that the heat of the box itself seldom exceeds 600° F. In the direct flame, the metal piece is, of course, subject to much higher temperatures. The manufacturer states that there is no bend nor deterioration in the box from the flame. The box is held together by  $\frac{3}{16}$ " rods with suitable washers and lock nuts.

Some firms which have secured these asbestos heating boxes have installed

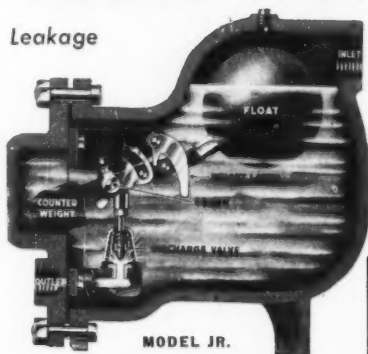


electric heaters by boring a hole through the asbestos support piece inside the box and running the wires down through the support piece. These hot plates run from 600 to 1200 watts. The boxes may be used

## Nicholson Air Traps STOP BLOW-THROUGH

Two Features Prevent Leakage

The discharge valve of Nicholson weight-operated air traps is unaffected by dirt and scale because of the large orifice and the nature of the operating mechanism. Thus tight closure and prevention of blow-through is assured. A positive waterseal at valve is another Nicholson leak-proofing feature. Three types, press. to 1500 lbs., for aftercoolers, separators, etc. For details, CATALOG 448.



**W. H. NICHOLSON & CO., 117 Oregon St., Wilkes-Barre, Pa.**

Steam & Air Traps • Control Valves • Expan. Mandrels • Arbor Presses • Welded Floats

to keep liquids warm and to boil liquids in containers. The asbestos heating boxes are manufactured by Congress Fan & Electric Co., P. O. Box 3747 Peninsula Station, Dayton Beach, Fla. 54

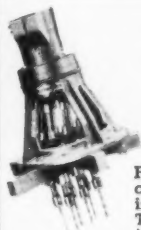
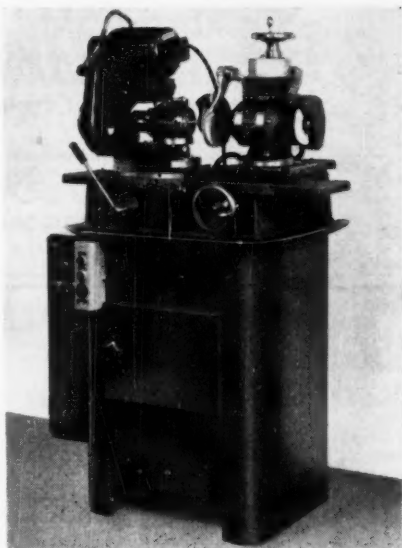
#### MOTORIZED RADIAL RELIEF GRINDER

A new powered model of the D-S Radial Relief Tool Grinder adapts this equipment to the economical grinding of production tools in volume. The motor drive employed is a General Electric Thymotrol Unit which gives a stepless speed control through 18 to 150 r.p.m. at the turn of a dial. This speed control gives the operation a hand touch and permits finish grinding to take place at the most desirable speed.

A complete, self-contained coolant system with tank and pump is included.

Motorization presents no interference with the regular mechanical operation of the fixture. Cams, for tools of 1 to 14 flutes, can be readily interchanged as can collets.

The Radial Relief Tool Grinder is made by D-S Grinder Division, Royal Oak Tool and Machine Co., 621 E. 4th St., P. O. Box 111, Royal Oak, Mich. 55



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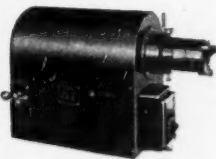
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HOUR**



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### **PORTABLE SPOT WELDER PERMITS ONE-HAND OPERATION**

"Big Shot" is a portable spot welder which the operator takes to the job instead of bringing the job to it. This affects new saving on manufacturing, assembly, installation or repair costs. The "Big Shot" welds quickly up to the limits of its heat; the 110-volt unit welds two sheets of any weldable steel 20 to 18 gauge, galvanized iron, Monel and Hoskins alloys, stainless steel 2 gauges thicker. The 220-volt unit welds up to 1/8" thickness.

This portable spot welder is useful for manufacturers, assembly, and maintenance departments in industry; for installing; repair, body, tin and sheet metal shops; manufacturers of sheet metal products, and many others. Its size is 4"x4"x15"; the special round nose, top and sides make it excellent for reaching difficult places.



The "Big Shot" is a 22 lb. portable unit which is operated with only one hand, leaving the other hand free to move and position the work. Because one of

### **SUPERIOR QUALITY AND WORKMANSHIP IN PLUNKET VISES**



**SQUARE BASE SHAPER VISE**

The Shaper Vise has graduated swivel base and tongue in center to fit slot in table, and has holes for bolting down. In ordering this vise give size of slots in Shaper Table, also distance from center to center of slots.

No. 48, 10" jaws, 2 1/4" deep, opens 8 1/2". Weight 125 lbs. \$84.00

No. 4, 6" jaws, 1 1/2" deep, opens 5". Weight 45 lbs. \$62.00

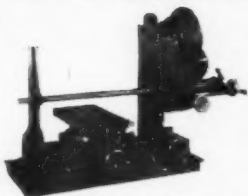
Our complete line includes Vises for Drill Presses, Milling Machines, Shapers and Grinders.

Prices are net, f. o. b. Chicago. Write for illustrated folder today. Dealers inquiries solicited.

**J. E. Plunket Machine Co.** 1823 W. Lake St.  
Chicago 12, Ill.

## LOW COST BENCH MODEL BORING MILL

For Experimental Dept. Tool Room  
Repair Shop & Jobbing Shop



Model M1 Midget Boring Mill

1. Low priced, bench model, precision, horizontal boring mill.
2. 16 speeds from 20-825.
3. Built in universal table graduated in degrees, full 360°.
4. Vertical, cross, and bar movement dials reading in 1/1000".
5. Useful in tool rooms, experimental departments, small shops, repair shops, jobbing shops.
6. Timken bearing spindle, hardened and ground 1 1/2" bar.

Write For Circular M1

Mfd. By **CONRAD MACHINE CO.**  
LOMBARD, ILL.

the operator's hands is free to hold the work, clamping devices are unnecessary.

The unit is equipped with a Modulator, or power control which can be adjusted to varying power conditions. When the unit is not heating, therefore not welding properly, the Modulator may be turned to another position for faster performance.

On the "Big Shot" the upper tong is fixed, while the lower tong moves. When in operation the top tong is placed on the exact spot to be welded. Thus, "Big Shot" rests on its upper tong over the place to be welded. The operator is not straining to hold it up for contact; he squeezes the control, up comes the lower tong; he touches the switch and the weld is completed.

Tongs are square to prevent twisting out of position. They have twice the usual area, all of which makes for a fast, clean weld, with the square tongs meeting perfectly. Specifications are 3 1/2" reach, 5" overall; 6" reach, 7 1/2" overall; 12" reach, 13 1/2" overall.

Capacity is 110 volt and 220 volts; 3 KVA; 10 feet of No. 14, 3 wire conductor, and plug furnished with 110 volts. The 220-volt unit must be directly attached to comply with safety codes.

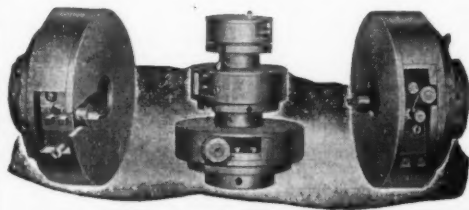
Made by: Tool and Equipment Distributors, 636 S. 10th Ave., La Grange, Ill. 56

### SAFCO ALL-PURPOSE COOLANT BASE

Safco 770 Compound is a new development in a water-soluble coolant base. It is a compound with the consistency of a liquid paste, combining in a single water-soluble product all of the essential qualities of a grinding compound and a sulphurized cutting oil, without their objectionable features according to Swan-Finch Oil Corporation.

When used in grinding operations and mixed with water in ratios as high as 80 to 1, it will prevent wheel-loading; reduce wheel-dressings; keep work from rusting; keep solutions sweet and free of odors. In machining operations, Safco 770 solutions exhibit the same lubricating and anti-weld properties of sulphurized oils, without smoke, odor, dermatitis, or burnt hands, according to the manufacturer.

Safco 770 is said to help to reduce the number of coolants required by most plants. Definite economies in coolant and machining costs are also affected. Swan-Finch Oil Corporation, R.C.A. Building, West, New York 20, N. Y. 57



### MUMMERT-DIXON FACING HEADS with Automatic Feed

One-way Tool Feed — 6, 9 and 12" sizes.

Two-way Tool Feed — 9, 12, 16, 20, 24, 30, 36, 40 and 46" sizes.

Save many costly set-ups.

Bulletin No. 4141 Gives Full Details

**MUMMERT-DIXON CO., 122 Philadelphia St., Hanover, Pa.**

### LAPMASTER MONOCHROMATIC LIGHT & OPTICAL FLAT

Precision-measuring Lapmaster Optical Flats and Monochromatic Lights for checking flatness accuracy to less than one light band (.0000116") are announced by the Crane Packing Company. The Monochromatic Light was developed to check the extreme accuracy of parts lapped on the Crane Lapmaster machines, and it is equally effective for checking light band flatness of any superfinished surface.

The Monochromatic Light provides better than 25-foot candle power illumination on the checking surface. Its helium gas filled tubular light is recessed into the cover and diffuses light through a flashed opal diffusing glass. Light transmitted is a strong, near one-color light of 11.6 millionths of an inch per dark interference band.

The light source and checking stage are a self contained unit, in an aluminum case. The unit is easily moved by means of an attached handle, and is adjustable from the stage to a bench type by rotating the head 180°.



The above illustration shows the Monochromatic Light with the Optical Flat in "stage-type" position, for light band flatness reading. The white stage being used in a special master flat which can be furnished by the maker upon request.

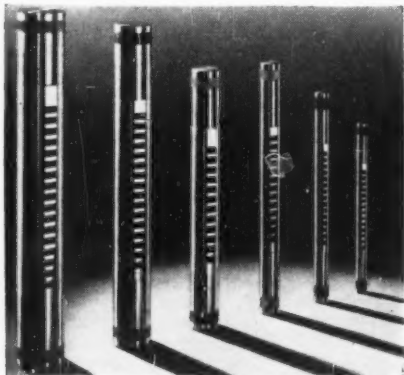
Lapmaster Optical Flats are made of high quality natural quartz. They are transparent, have exceptional wear characteristics, are abrasion resistant and will withstand thermal shock. Flats of

1/10 light band, accuracy (.00000116") and 1/5 light band accuracy (.00000232") are standard. The sizes range up to 6" diameters.

Full information may be obtained from the Crane Packing Co., 1877 Cuyler Ave., Chicago, Ill. 58

### BROACH LINE EXPANDED TO WIDE RANGE OF SIZES

The Kase Machine Company has announced the expansion of the standard line of Glenny broaches to include sizes from 5/16" to 2" in increments of 1/16-inch. A 2-1/2" broach is also available as standard.



This new expansion in size range makes it possible for any one of the standard 28 broach sizes to be shipped from stock together with as many as four different blade widths for cutting a wide variety of keyways in gears, bushings, hubs and other metal or plastic products.

All of the new Glenny sizes feature a patented tooth design which provides a large chip chamber. End nuts facilitate rapid and infinitely variable adjustment for depth of cut by moving the cutting blade back and forth in a taper-milled slot. This action raises and lowers the cutting blade to meet individual job specifications.

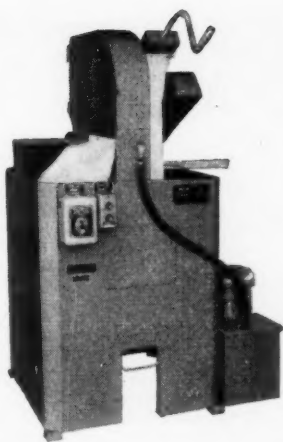
Glenny broaches are said to be useful in job applications where a wide variety of keyways are to be cut. The worker simply inserts the blade width required, adjusts it in the slot to produce the proper depth of cut, and tightens the end nuts. The broach is then inserted in the workpiece and a clean keyway is cut in minimum time. For production operations, the blade can be moved

slightly in the milled taper slot to adjust for wear.

Bushing type adapters are available for use with all of the new size Glenny broaches to permit keyway cutting in bores larger than standard broach diameters. **The Kase Machine Co., 18428 Buffalo Ave., Cleveland 19, Ohio.**

#### **CAMPBELL BAR TYPE ABRASIVE CUTTING MACHINE**

The Campbell Machine Division of American Chain & Cable Company, Inc., have announced their new Model 15 Wet or Dry Abrasive Cutting Machine. It is available with either a 3 h.p. or 5 h.p. motor and each type may be arranged for either wet or dry cutting. This new unit is suitable for general purpose work; it will cut tubing angles, bar stock, etc., within its capacity with a minimum of burr, with the use of a suitable abrasive wheel. It handles either ferrous or non-ferrous material, including corrosion resisting, hardened or annealed steels. The machine cuts light wall tubing of all types up to 1½" diameter and solid bar stock up to ¾" diameter with the 3 h.p. motor, or light wall tubing up to 2" diameter and solid bar stock up to 1" diameter with the 5 h.p. motor.

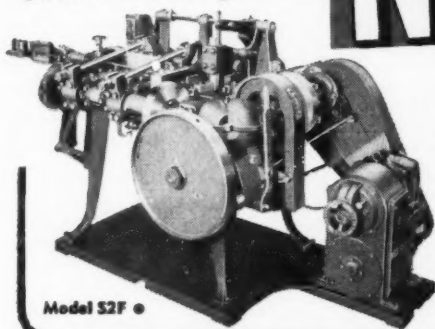


The details of construction of this new machine are described in the folder No. DH-102-C. Made by **Campbell Machine Div., American Chain & Cable Co., Inc., Bridgeport, Conn.**

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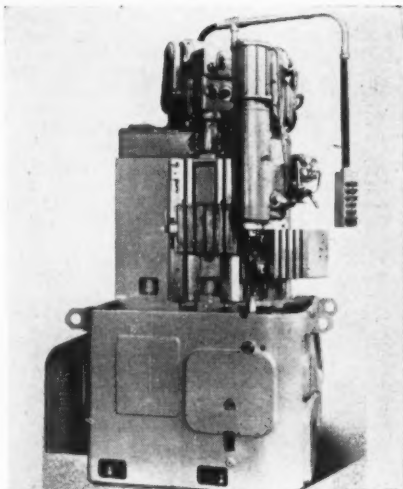
## VERTICAL AUTOMATIC PRODUCTION LATHE

A Vertical Automatic Production Lathe designed for turning, boring and facing work has been developed with the object of taking full advantage of high speed negative-rake cutting tools.

This new unit is controlled by a central cycle timer which, after the work has been chucked, starts the spindle, starts each slide to move at its appointed time and, when the last tool has completed its work, stops the spindle.

Unit construction has been adopted throughout. The slides are independent of each other and may be set to go through their motions at any time during a machine cycle. Feed boxes for each slide are identical and each is complete with its motor, hydraulic system for shifting the clutches and solenoid operated valves. Feed boxes permit traversing of tools to cutting position, feed, stop, dwell, return and then stop for removal of workpiece.

For setting up the machine, all movements may be controlled by pushbuttons located in a pendant panel. A selector switch selects the slide to be moved; then by means of the pushbutton, the slide may be moved at feed rate or



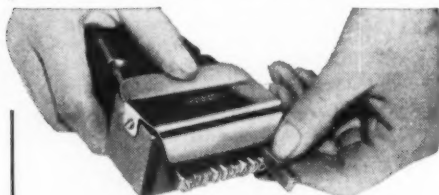
rapid traverse in either direction as required. Tools may be fed into cut and



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You just press the clip to change the number.

A wide assortment of sizes are carried in stock so you can quickly do your parts numbering.



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15 MORRELL ST., ELIZABETH 4,  
NEW JERSEY

actual work performed as a final check on correct tool set-up.

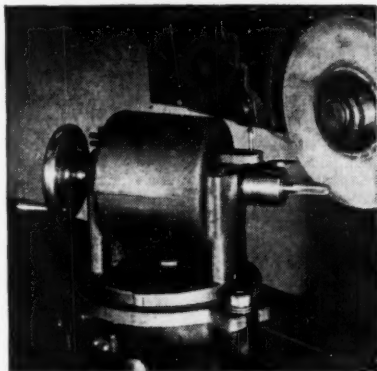
The standard machine is equipped with one turning slide, one facing slide (arranged to swivel) and a tailstock, which may be replaced with a boring head when needed. The lathe is designed to permit adding of an extra slide; attachments for taper turning or forming, and for other types of work may be supplied as required. Machine dimensions are 70" long, 65½" wide, 113" high. Dept. V-28, Reed-Prentice Corporation, Worcester 4, Mass. 61

#### TAP SHARPENER FOR FLUTED TAPS

A new type of sharpener for taps has been announced by the Car-Anth Manufacturing and Supply Co. This sharpener handles any 2, 3 or 4-fluted tap with shank sizes up to ½". Based on a new cam-operated principle, it will sharpen tap leads to the correct angle and with the correct amount of relief to assure clean cutting of threads, the manufacturers state.

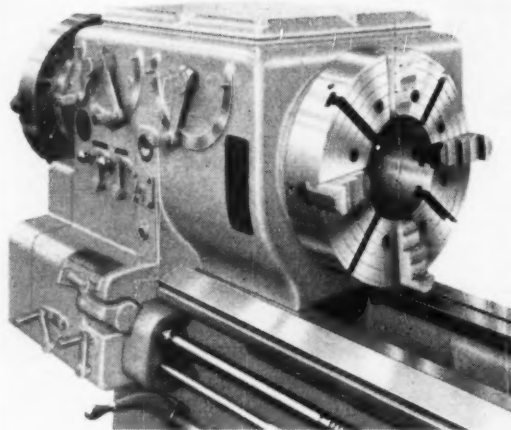
The manufacturers also claim that many broken and damaged taps can be re-sharpened, and that use of this ma-

chine assures that flutes are ground uniformly. Correct centering means more accurate cutting of threads. It is stated that the machine is easy to set up and that the average operator can learn to



use it in just a few minutes. The tap sharpener is made by the Car-Anth Manufacturing & Supply Co., 411 Eichelberger St., St. Louis, Mo. 62

## New 20" LeBlond Hollow Spindle Lathe Has 9" Bore



The new 20" LeBlond spindle lathe will qualify for an important position in the oil country, steel industry, or any other spot where a 9" opening through spindle, a 27" swing capacity and an 18-speed geared headstock arranged for 15-hp main drive motor are required. This newest addition to the LeBlond line is furnished with an electric brake, totally enclosed quick change box, hardened and ground steel bed ways and many other modern lathe advantages.

For complete information write today for Bulletin HS-111.

**THE R. K. LeBLOND MACHINE TOOL CO., CINCINNATI 8, OHIO**

Largest Manufacturer of a Complete Line of Lathes





**Produce your small  
precision parts with  
well-known "DERBYSHIRE" accuracy**

**Illustrated:**

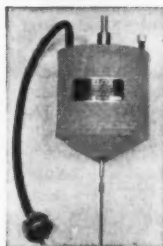
The DERBYSHIRE ELECT lathe with 18" bed; ball-bearing headstock with collet closer attachment; double compound rack-and-pinion slide rest with front tool post slide graduated to swivel 360°; six-position turret to take standard tools.

**Write for Catalog**

**F. W. DERBYSHIRE, INC.**  
WALTHAM 54, MASS. 157 HIGH ST.

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Clawson, Michigan, U.S.A.  
Phone, Detroit: Jordan 4-8173

### THE PANT-O-SCRIBER DIE CHECKER

The Pant-O-Scriber Die Checker provides a fast and accurate visual method of gaging the contour profiles, flash and striking surfaces for forging dies and punches. The Die Checker incorporates many of the features used in the Pant-O-Scriber Blade Checkers. It offers the following characteristics:

1. Fast semi-automatic operation
2. Permanent inspection record of die sets
3. Permits periodic quality control check for die wear
4. Checks master die set, or wear, in relation to master chart
5. Checks duplicate die set, or wear, in relation to master die
6. Permits checking of shrinkage between die and forged part
7. Visual inspection, with operator viewing simultaneously entire cavity, flash, or gutter profiles and striking surfaces of any desired cross section of dies and punches



8. Finishing operations or modifications of dies can be made without removal from the die checker
9. Takes die blocks up to 800 lbs. and sizes up to 22" length x 14" width x 12" thick. (Larger units available)
10. Entire gaging column can be quickly

moved to one side when loading dies or when making modifications on dies

11. Time: less than 60 seconds per section
12. Skilled or highly trained operators not required

The basic principle of the Pant-O-Scriber incorporates X and Y pre-loaded ball bearing movements and tracer roller features. An adjustable follower, having a .125 radius, is attached to one end of an arm, on the opposite end of which is incorporated a motor driven rotating spindle carrying a "Fly-Tool" type of scribing cutter head. This cutter rotates in circles which are exactly the same as the tracer follower. As the tracer moves across the die in the X plane, the motor driven scribing cutter duplicates the movements and in so doing "scribes" the colored film from the Pant-O-Scriber glass. The arm is also mounted on a cross beam in the Y plane, and provides an accurate free movement of the tracing follower and the scribing cutters in the X and Y planes.

As the column is indexed to the second gaging position, determined by gage block settings, the Pant-O-Scriber Glass also is indexed a known distance and

the second section of the die is Pant-O-Scribed on the same glass. Up to nine sections can be scribed on each glass.

The scribed glass plate is then removed from the machine and placed on the measuring stage of a vertical type Vugraph Delineascope. A precision "1:1" ratio master chart is properly positioned on the delineascope, and the Pant-O-Scribed glass is placed in register with the master chart. The die contour and master, in contrasting colors, are in true relationship to each other as projected on the screen. This relationship would be unaffected by any possible imperfection of the projection lens.

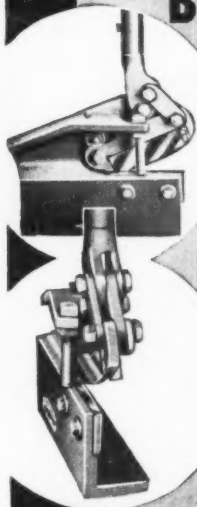
The Pant-O-Scriber Die Checker is made by **Engineers Specialties Division, 980 Ellicott St., Buffalo 8, N. Y. 63**

#### AIR CYLINDERS WITHOUT TIE RODS

A new line of air cylinders, designed without tie rods has been introduced to meet the requirements of manufacturers of the finest machine tools. The new cylinders are designed for air pressures of 80 lb. p.s.i. to 100 lb. p.s.i. They are offered in seven different styles, up to 8" bore, and are available with or without adjustable cushions.

The new cylinders are claimed to offer

## BEVERLY *Slitting* SHEAR



"S-3" Slitting Shears for slitting, cutting and trimming sheet steel or any other material, have compound power transmission, which provides smooth, easy operation. Interchangeable and adjustable blades of high quality tempered and drawn tool steel are firmly held in alignment by the rigid frame to assure clean cutting, regardless of the thickness of metal—up to capacity. Unique adjustable shoe, bearing on upper blade holder, provides additional support, for the upper blade, which increases the strength and cutting efficiency of the Shear.

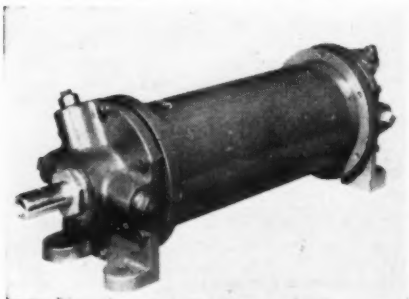
Slitting capacity 1/8"; trimming 3/16";  
bar capacity 1/4" x 2" (capacities given  
are in mild steel)

Ask your Beverly Dealer for a demonstration or  
write for full details and illustrated circular.

High Carbon High  
Chrome Blades for cutting  
stainless available on  
special order.



the following advantages: elimination of the tie rods improves their appearance and that of the equipment on which the cylinders are installed, as well as making the external surfaces of the rod easier to clean. It further eliminates the stretching of tie rods, which is apt to cause trouble, especially in long stroke



cylinders, by allowing leakage to occur between the cylinder heads and the cylinder body. The cylinder body is not subjected to longitudinal compression stresses, usually called column stresses, such as are always present when tie

rods are used. In extremely long stroke tie rod type cylinders, especially in the smaller bore sizes, unequal tension in the tie rods can actually bend the cylinder body, causing serious misalignment and poor operating characteristics in the cylinder.

Instead of tie rods, round snap rings, seated in grooves in the cylinder body, and steel clamping collars are used. Grooves in the cylinder body are rounded to fit the round spring steel wire snap rings. Clamping collars are designed to hold the snap rings firmly against bottoms of grooves in the cylinder body, providing optimum support for the cylinder body at these points. Standard heat-treated socket head cap screws are used to attach clamping collars to the cylinder heads.

The new type air cylinders are made by Tomkins-Johnson Co., Jackson, Mich.

64

#### HIGH SPEED TUBE BENDER

A new development in high speed hydraulic automatic universal tube and miscellaneous bending machine is announced by the Acme-Winter Corporation. These units are furnished in several sizes for bending up to and including

## LOWN . . . . . SLIP ROLL FORMING MACHINES



Distributors in  
Principal Cities

Model B-400  
4" diameter

- Initial Type-Power Driven. • Rolls 4" diameter. • Oilite bearings - Alemite lubrication. • New type quick acting latch on drop arm. • Hand wheels on adjusting screws. • Roll position indicators. • Fast, sturdy and easy to operate. • Prompt deliveries.

- Other size machines also available.

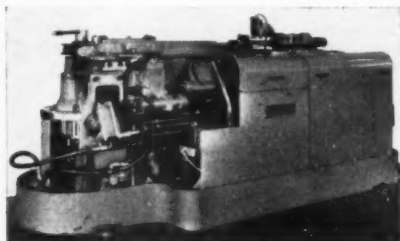
Write for Bulletins

### SAN ANGELO FOUNDRY & MACHINE CO.

San Angelo, Texas . . . . .

1000 E. Upton.

3" o.d., 1/4" wall or larger die tubes of the same area. The short bending head allows the operator to work in front of the machine. The standard machines are equipped with six automatic stops for various degree of bends, and are indexed automatically.



The machine bends either right or left hand with the standard dies, and can be furnished with hand control and automatic mandrel ejector. Rigidity and flexibility of die setting and operation has had special attention in the machine's construction. Units can be furnished with special extension tables and adjustable gauges to suit customer's needs.

The machine is a single unit having the motor and oil tank situated in the base or pan and all valves and pipe connections are above the base to prevent oil from getting on the floor, should leaks occur. The bending head is made of cast steel, is fitted with needle bearings and operated by rack and pinion. The machine is made by Acme-Winter Corp., Buffalo 13, N. Y. 65

Neil C. Raymond, president of A. S. Campbell Company, Inc. of Boston has announced purchase by a newly formed subsidiary of the Campbell Co. of the assets of the Rollins Engine Co. of Nashua, N. H. This company, since 1946, has been owned solely by Russell L. Sylvester. The new company will be known as the Rollins Engine & Machine Co., Inc. and will maintain its present plant and organization at Nashua with Mr. Sylvester as vice president and general manager.

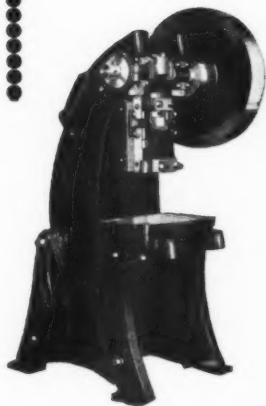
The Detroit branch office and warehouse of Bay State Abrasive Products Co., Westboro, Mass. is now located at 880 Lawndale Avenue, Detroit 9, Mich.

# BUY MARSHALLTOWN

## LONG LIFE

## FOR DEPENDABILITY

## PERFORMANCE



They are engineered and built to give you the most for your money. They incorporate many outstanding advantages and features of design; include more die space — chrome molybdenum cranks, wrist pin connections.

*Write today for literature.*

**MARSHALLTOWN MFG. CO.**  
900 E. Nevada Street  
**MARSHALLTOWN, IOWA**

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No. 2405599

Concentricity in  
Low 10,000ths

NO MORE  
"C" WASHERS  
OR  
WRENCHES

NO MORE  
DRAWBARS  
OR  
AUXILIARY  
EQUIPMENT

TIME-TESTED  
OVERRUNNING  
CLUTCH

SELF LOCKING  
INSTANT UNLOADING

**NEW,  
AMAZING  
MACHINING  
TECHNIQUE**

**YOUNG PRECISION EXPANDING  
MANDRELS FOR PRODUCTION  
OR INSPECTION**

Curtiss-Wright Corporation ranks our product with their best tools. Cleveland Graphite Bronze Company, leading bearing manufacturer, states new high accuracy reached, plus substantial production boosts.

ROUGHLY SKETCH DESIRED MANDREL INTO YOUR PART PRINT AND FORWARD FOR QUOTES.

**YOUNG ARBOR CO. • PH. TOWER 1-3076**  
2148 Scranton Road Cleveland 13, Ohio

# BAUMBACH

## THE FIRST IN DIE SETS

Surfaces ground to assure Parallelism

Removable Pins and Bushings

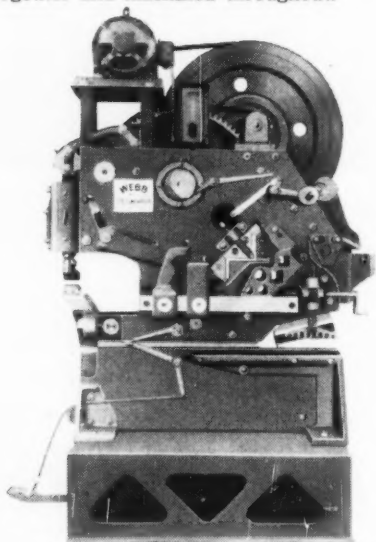
Doweled after Alignment

Being originators of Standard Die Sets naturally we are steps ahead in Design—Precision—Dependability and Economy. Baumbach Die Sets can be disassembled. The Leader Pins and Bushings can be used on other size Die Sets—reducing inventorying a lot of Die Sets. Costly machining time is also reduced. Learn all about Baumbach advantages before you buy. Write for circular.

**E. A. BAUMBACH MFG. CO.**  
1810 S. Kilbourn Ave. • Chicago 23, Ill.

## THE STEELWORKER, COMBINATION PUNCH, SHEAR AND COPER

The Webb Corporation has recently developed The Steelworker, a combination punch, shear and coper, for use in structural and maintenance shops and other plants where punching and shearing operations are regularly scheduled. The entire unit is of uni-steel construction with steel plate accurately fitted together and machined throughout.

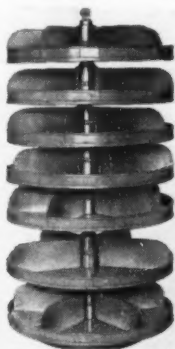


At one end of The Steelworker, the user can operate the punch; on the opposite end of the machine, a section cutter for the cutting of angles, T's, Z's, either straight or miter cut, as well as the straight cutting of round and square bars, can be accomplished. A shear for the shearing of  $\frac{1}{2}$ " plate is also provided. In addition, either a coping or notching attachment can be provided for the coping of I-beams and channels or the notching of angles. The Steelworker is a compact unit and is powered with a 3 h.p. motor. Made by The Webb Corporation, Webb City, Mo.

## LYON REVOLVING STORAGE BINS

Lyon Metal Products, Inc., manufacturers of steel shelving units announces their new 7-shelf units (illustrated), 4-shelf unit, and counter top revolving bins. These revolving bins are complete storage units in themselves; each shelf

is provided with a continuous label holder. Up to five additional dividers can be added to separate each bin into smaller compartments. Wide spacing on the bottom shelves permits full visibility and quick availability of parts.



The manufacturers state that these multiple-shelf units save time and steps, as well as speeding up stock-room service. The shelves revolve easily in either direction on ball bearing rollers. The

shelves are stabilized in order to prevent sagging when they are unevenly loaded; the broad space prevents tipping.

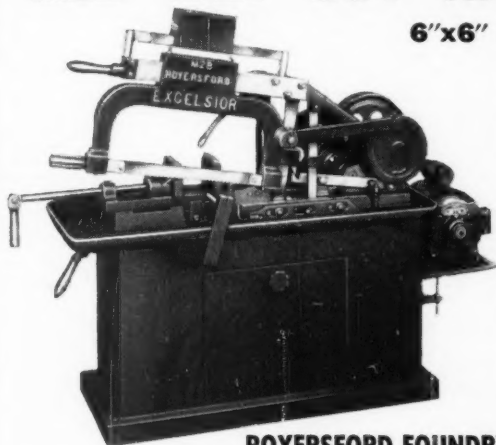
The 7-shelf unit is 34" in diameter ad 65-11/16" high; the 4-shelf unit is 34" in diameter and is 37-11/16" high; the counter top unit is 17" in diameter and is 18 3/4" high. The bins are finished in green baked-on enamel. Made by Lyon Metal Products, Inc., Aurora, Ill.

67

The Board of Directors of General Motors Corp., Detroit, Mich., recently elected four vice presidents, as follows: **Hugh Dean**, to be executive in charge of the manufacturing staff, which includes procurement and schedules, facilities and processes, and real estate; **Carl H. Kindl**, to be group executive in charge of Canadian and Overseas Operations for General Motors; **Wilbur H. Norton**, to be executive in charge of a new activity having responsibility for the development of policies and procedures in connection with parts merchandising; and **Elis S. Hoglund**, who will continue to serve as assistant general manager of the General Motors Overseas Operations Division in charge of its manufacturing plants abroad.

## M2B WET CUT HACK SAW

6"x6" CAPACITY



Occupying a floor space of only 21"x54" the M2B Hack Saw provides an efficient, low cost cutting operation. Blade lifts automatically on return stroke. Motor driven . . . V-Belt drive. 3 Speeds. Gravity feed. Swivel vise, cutting to an angle of 45°, is interchangeable. Coolant pump operated by cam and mounted on inside of base. Here's a Hack Saw which will reduce your costs and increase production . . . send for full details today.

**ROYERSFORD FOUNDRY & MACHINE CO., INC.**

BOX B ROYERSFORD, PENNSYLVANIA

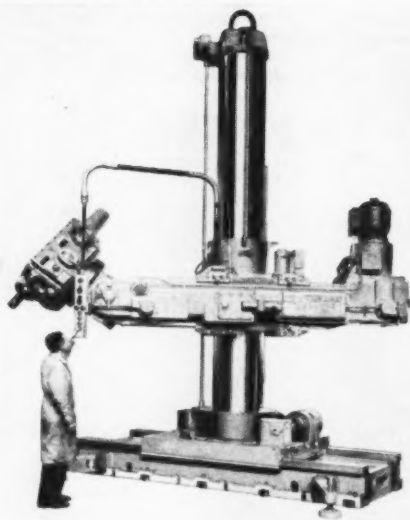


## KAUKAUNA UNIVERSAL DRILLING AND TAPPING MACHINE

The new heavy duty, universal Kaukauna Drilling and Tapping Machine provides 97" radial reach with the spindle in vertical position; the standard machine with base column height will drill holes at any point in a range from 18" to 134" above the floor with the spindle in a horizontal position. It is capable of performing all radial, horizontal or angular operations such as drilling, tapping, boring, spotfacing or reaming on a production basis; and it can be supplied for fixed-location applications or for use as a portable unit with stabilizing spreader arms, leveling jacks and a lifting bail.

It has a 4" diameter nitrided spindle with 18" of manual and power feed, either No. 5 or No. 6 Morse taper hole and nine speeds in a choice of three ranges from a minimum of 25 r.p.m. to a maximum of 800 r.p.m. with a spindle drive power range from 10 to 20 h.p. The spindle head swivels 360° on the trunnion and the trunnion rotates 180° on the rails, thus permitting the spindle to be positioned for angular, compound angular, horizontal or vertical operations in any combination of vertical, horizontal and radial positioning movements. Both swiveling units are power driven with controls located in the pendant station, and the rails supporting the swiveling spindle head and trunnion have a power driven horizontal traverse of 36" for rapid tool positioning with convenient hand wheels for ease in final accurate positioning.

The entire rail unit, carrying the spindle head, spindle drive and transmission, is provided with 60" of vertical movement on the column with power rapid traverse up and down. The controls for this movement include inching controls



and are located in the pendant station. The column which carries the rail unit is 22" in diameter, can be swiveled through 360° to permit machining operations at any point around the machine, and is provided with an electric swivel clamp which eliminates off-position creep.

Nine spindle speeds and nine spindle feeds are each selected by dual rotary selector levers with direct reading indicator dials showing the speed or feed engaged. Additional travel of any of the various units can be provided to increase the coverage range as may be required to meet any particular application.

Manufactured by Kaukauna Machine Corporation, Kaukauna, Wis. 68

## THREE SIMPLE STEPS



**THE WALTON COMPANY**

Remove broken taps with **WALTON TAP EXTRACTORS** as fast as 1, 2, 3.

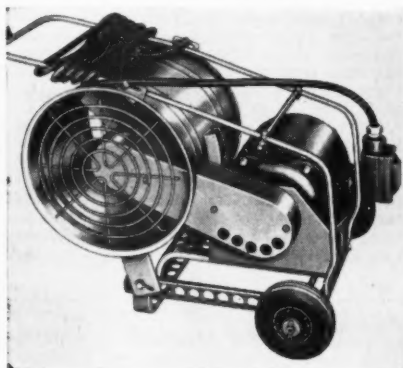
First, slide fingers into flutes of broken tap. 2. Adjust holder and sleeve to the work. 3. Apply tap wrench and back out the broken tap.

Economical; time saving; tested and proved for years in all kinds of shops. See your dealer or write us for Folder No. 12 and details of free trial offer.

• **Hartford 10, Conn.**

## NEW PORTABLE VENTILATORS

Work in high-temperature and noxious atmospheres is said to be safer and more comfortable with a newly developed ventilator. Equipped with high-velocity fans powered either by gasoline or electricity, these new units provide both ventilating and cooling air, and are so compact and lightweight that they can be wheeled from place to place on the job.



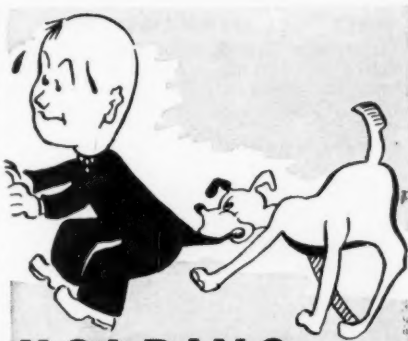
Air is conveyed to the desired point through a 14" diameter, 16-footlong canvas duct. Ducts are treated for flame and mildew resistance, and when not in use can be collapsed and folded into a compact bundle. A two-way air flow feature permits the duct to be connected to either the inlet or discharge side of the fan—allowing both dust or noxious gases to be drawn from the area, and fresh ventilating and cooling air supplied to the area.

The ventilators are useful for cooling and ventilating tunnels, manholes, ship holds, engine rooms, storage tanks, etc. They are equally helpful for exhausting gases and vapors, removing fumes from welding operations, and withdrawing dust during sandblasting, cement unloading, and for operations incidental to construction work.

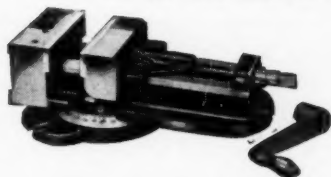
Up to 32 feet of duct may be connected on the belt-drive models to either the inlet or discharge side of the fan. Ventilators may also be connected in series, considerably reducing power requirements.

Illustrated bulletin No. CU-2 is available from Mine Safety Appliances Co., Braddock, Thomas and Meade Sts., Pittsburgh 8, Pa.

69



## HOLDING POWER!



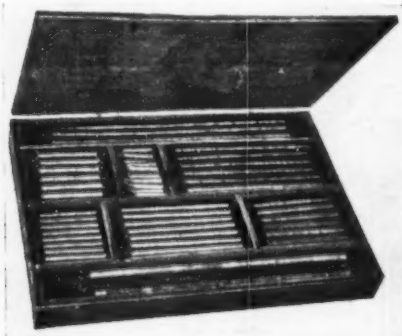
Yes, Graham Vises hold! Also cuts down cost of jigs and fixtures. Accurate, too, with adjustable zero pointer to obtain exact coincidence with zero on base scale. 360° rotation with positive 2 point lock in position. Drilled and tapped for use of jig attachments and special jaws, special design controls return of coolant from vise thus protecting swivel base. Screw never extends under jaw opening thereby eliminating possibility of screw damage. Vise is removable from swivel base and may be used independently for drill press work. Send today for Bulletin 44, a well illustrated and informative folder. Every shop needs Graham Vises for accuracy, holding power and economy. Write now.

VICES • KNURL HOLDERS • GRINDERS  
SPECIAL PRECISION MACHINERY

**GRAHAM MFG. CO.**  
61 BRIDGE ST., EAST - GREENWICH, R.I.

### NEW PECK SPRING ASSORTMENTS

The Peck Spring Company, manufacturers of springs and screw machine products, offers to industry three new types of spring assortments. These assortments contain oil tempered steel springs, made from the finest materials;



they can be made to fit nearly all applications relative to product engineering designing and maintenance.

Each assortment is packed in a heavy

cardboard container. The springs, ranging in size from 1" to 1½" in length and up to ½" in diameter, are packed in separate sections. The manufacturer states that an unlimited number of different springs can be made from each assortment.

Assortment No. 1 contains a mixed group of approximately 100 springs made of brass or steel, of the extension and compression varieties, a good assortment for the small user. Assortment No. 2 contains about 250 extension and compression springs, packed in separate sections, ranging in length from 1" to 1½", and up to ½" in diameter. This is a very complete selection, made from fine steel, to fill practically every small spring requirement. The Assortment No. 2A (illustrated) contains a selection of tempered steel extension springs only. These range from 1" to 1½" in length and up to ½" in diameter. Made by Peck Spring Co., Plainville, Conn. 69A

Alexander H. d'Arcambal, vice president and sales manager, Small Tool and Gage Div., and consulting metallurgist of Pratt & Whitney Division, Niles-Bement-Pond Co., West Hartford, Connecticut, recently observed the 30th anniversary of his association with the Company.

Joining Pratt & Whitney as chief metallurgist in 1919, Mr. d'Arcambal directed the program of the company in metallurgical developments applying to machine tools, cutting tools and gages. He also directed all of the metallurgical work pertaining to the P & W Aircraft engine during the development of that product. 70

### SAVE 90% CHECKING TIME WHEN BUILDING DIES

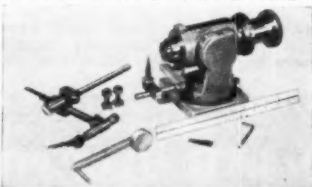
This new method of checking tapers on dies does away with die squares and height gauges.

Write for complete details.

**Tietzmann Tool Corp.**  
318 N. Main St.  
Englewood, Ohio



### The Universal CUTTER GRINDING FIXTURE



Reground your worn tools to original forms . . . at low cost with the fully universal cutter grinding fixture which can be used on ANY make of universal tool or surface grinder. Base graduated in 180° . . . spindle housing in 360°. Has features not found in much higher priced machines. Begin now to enjoy the time saving and cost cutting advantages which only the Universal can give you. Order today. Fully descriptive literature on request.

**Only \$175.00**

**F.O.B. Leominster**

Representatives: Several attractive territories still open in U.S. and Canada. Write today.

**ROCHELEAU TOOL & DIE CO. 650 N. MAIN STREET  
LEOMINSTER, MASS.**


## ETCO ADJUSTABLE HEAD OFFSET TOOLS

A new line of adjustable head off-set tools in both standard and special forms is announced by Eastern Tool Co. These Ectco adjustable tools are designed with a head which is adjustable on its holder so that it may be raised in relation to the center line of the work to be machined, in order to compensate for wear from regrinding or sharpening the carbide tip.

The tools are adaptable to Bullard vertical turret lathes as well as to conventional turret and engine lathes. The tools have the following extra features: reduced grinding cost, since rough grinding is practically eliminated; reduced set-up cost, as only the head has to be changed; reduced tip fractures, since only one surface is brazed, it relieves the stress and strain on the tip; reduced off-set form tool cost, due to its ease in grinding and adjusting to center; reduced crib space permits up to 75% savings in space.



These heads or cutting blades are sold, six to a package, with a tool holder furnished at no charge. Made by Eastern Tool Co., East Hartford, Conn. 71



### EFFICIENT — LOW COST PRODUCTION

MEANS

# ROUSSELL

PUNCH  
PRESSES

WRITE FOR  
DETAILS

**O. B. I. PRESS**

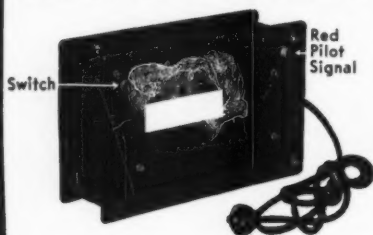
**HORN PRESS**

**DEEP THROAT**

**7627-33**  
**S. Ashland Ave.**  
**Chicago 20**

SERVICE MACHINE COMPANY

## AMC *Quick* DEMAGNETIZER



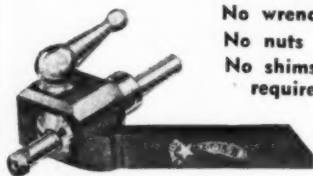
A necessity where machine tools are used.

Standard units available.

Write today for descriptive circular.

**ALOFS MFG. CO.**  
1629 Madison, Grand Rapids, Mich.

## The NEW COMET TOOL HOLDER with ECCENTRIC Adjustment



### Advantages:

No wrenches  
No nuts  
No shims  
required

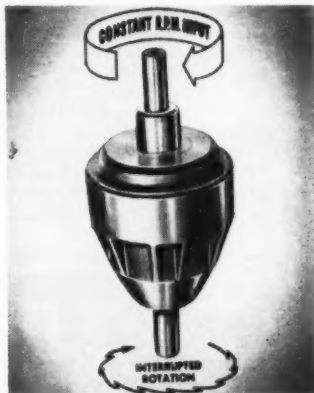
Fits all  $\frac{3}{8}$ " dia. bars, specially designed for precision boring and internal threading, for holes  $\frac{3}{32}$ " and up. Shank:  $\frac{3}{8}$ " x  $\frac{5}{8}$ ". Collets for smaller bars available.

### COMET TOOL COMPANY

738 Broadway New York 3, N. Y.  
Makers of famous  
COMET Int. Threading and Boring Tools

## THE AUGUR MOVEMENT—NEW POWER TRANSMISSION

Metal Seal and Products, Inc., has announced a new power transmission that converts and reduces a constant speed input to produce a quick-reversing action that interrupts the rotation of the output shaft every  $45^\circ$  of travel. This interrupting action is a short back-up motion that occurs approximately eight times in one complete revolution of the output shaft.



The Augur Movement is stated to be smooth and continuous throughout its cycle of operation, and the reversing action does not develop a torque which is counter to the direction of rotation.

Originally designed as a machine tool accessory to perform honing and lapping operations, the new Augur Movement is adaptable as either a power transmission or an agitator in widely diversified applications. It is recommended as a power transmission for tumbling barrels, screw-feed stokers, cement mixers, rotating displays, deep well drills, etc. It can be used as the source agitation in plating solutions; in mixing paints, varnish, and other chemical compounds; and in shake-out screens, hopper feeds, etc.

The Augur Movement has been designed to operate at any specified speed from any rotary power source. In many applications, it eliminates the need for a speed reducer. Factory-sealed in an aluminum housing, all units are permanently lubricated to assure long service life. Three standard sizes are available, and special sizes can be supplied. **Metal Seal & Products, Inc.,** 21861 St. Clair Ave., Euclid 17, Ohio. 72

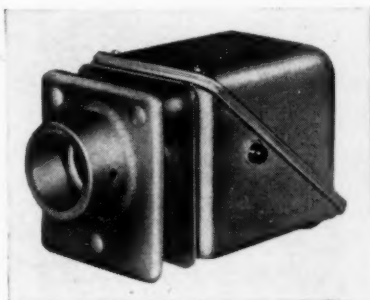
## PHOTOELECTRIC FLAME FAILURE SAFEGUARD

For flame failure protection of commercial and industrial oil burning equipment, Combustion Control Corporation has introduced the Fireye Flame Failure Safeguard Type F18T-2, illustrated below. It provides operating flame failure protection for manually ignited oil burners, air heaters, ovens, kilns, etc., and is used with programming controls to protect automatically ignited oil burners. On existing installations, this safeguard may be substituted for thermally responsive switches to give increased flame failure protection. The control is approved by all insurance laboratories.

The Fireye Type F18T-2 consists of a phototube and amplifying system housed in a compact dust-tight aluminum case. Modern electronic circuit design has been combined with mechanical refinements to make this control reliable and fool-proof. Special heat-resisting filters and heat insulating fins and spacers serve to insulate the housing from high boiler wall temperatures so that the entire control may be mounted directly on the furnace wall.

Other features include an hermetically sealed time delay element which prevents the relay from dropping out from purely transit flame disturbances: a pilot

light indicating flame failure which can be viewed through an angle of 180°, and a cover switch to prevent unsafe operation of the control should the cover be removed. The unit operates on a supply



voltage: of 115/208/230 volts, and a supply frequency of 50/60 cycles. The power consumption is 10 watts. Ambient temperature range is from 32° F to 150° F. Made by the Combustion Control Corp., 77 Broadway, Cambridge 42, Mass. 73

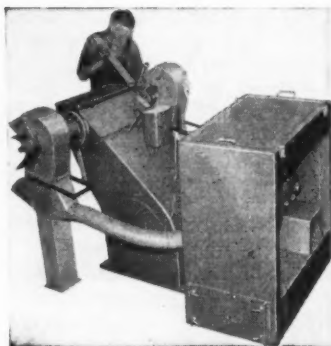
## STOP DUSTS with DUSTKOPS

Low Cost, Efficient, compact. For recirculating cleaned air or for outside exhaust (toxic or objectionable fumes). Twelve models (314 to 3600 cfm), to collect dust

from: grinding, buffing, polishing, sanding, wire brushing, bagging, blast cleaning, trimming, woodworking, etc.

Model 1150 — 1400 cfm — always the best choice for Hammond VRO Polisher.

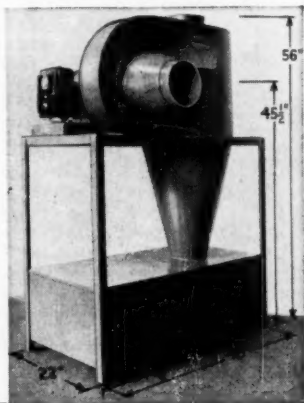
Model 20N30 — 2300 cfm — exhausts cleaned air outdoors.



For recommendation by return mail, describe dust problem. No obligation. New Catalog 605 now ready.

**AGET-DETROIT CO.**

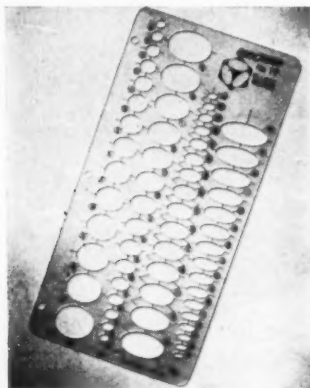
205 Main at Washington Sts.  
Ann Arbor, Michigan





## RAPIDESIGN ELLIPSE MASTER TEMPLATE

Rapidesign, Inc., announces its new No. 77 Ellipse Master Template for engineers, architects, draftsmen, etc. This ingenious device is provided with true isometric



ellipses projected from an angle of 35° 16'; it has allowance for pencil point to facilitate accuracy and drafting speed,

and has sixty ellipses ranging in sizes from 1/4" to 1 3/8", in small increments. The compactly grouped ellipses permit a wide range of sizes, yet maintain a handy working size template.

The Ellipse Master Template is applicable to all axonometric drawing. Each ellipse is milled from .030" mathematical-quality plastic material to engraving machine accuracy. The axes and sizes are indelibly printed on the face of the template to prevent wearing off. It has a matté finish to provide minimum glare; it is punched with standard three-ring binder holes for notebook use, and has rounded corners. Made by Rapidesign, Inc., P.O. Box 592, Glendale, Calif. 74

## HOW ARE YOU ON GRINDING?

Answers to Quiz on Page 74.

1. Silicon Carbide
2. 5000-6500 ft./min.
3. Mineral Seal Oils
4. On Surface
5. Too Hard
6. False
7. True
8. False
9. False
10. True

**WHEN ACCURACY COUNTS...**

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**MAGNE-BLOX**

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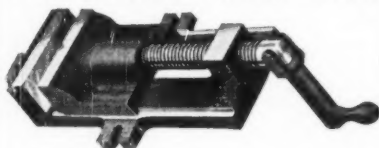
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COMPLETE LINE OF  
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## YOST DRILL PRESS VISE



This new Yost vise has been designed expressly for use on drill press operations. Does away with special and costly jig fixtures.

Offered in two sizes.

Vise No.	Width of Jaw, Inches	Opens Inches	Weight Pounds
1D	3 1/2	3 1/2	12 1/4
2D	5	5 1/2	23

Do you need a vise of ANY type?

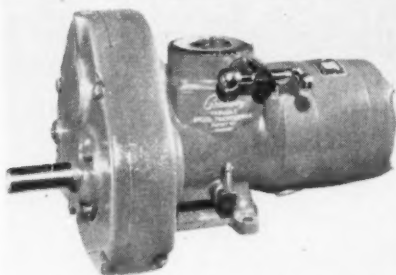
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**YOST MFG. COMPANY**

1335 SO. MAIN STREET  
MEADVILLE, PENNSYLVANIA

## VARIABLE SPEED DRIVE FOR SMALL CONVEYORS

A new, compact infinitely variable speed transmission especially designed for small conveyors is announced by Graham Transmissions, Inc. This new unit requires only four mounting screws and is complete with built-in motor, variable speed drive, and built-in two stage spur gear reduction. It is only 17 1/4" long, 8 3/4" high and 7 1/2" wide.



Designated as Model 20MT, the drive delivers all speeds from the desired maximum down to zero and will handle small conveyors usually driven with motors up to 1/4 or 1/3 h.p. High efficiency of the variable speed transmission, plus use of double reduction spur gears, permit the use of a smaller driving motor. Micrometer speed control permits rapid and extremely close speed adjustment to 1/400th of the dial periphery. The speed of a conveyor can be set to exactly match the speed of another conveyor or material being fed from a capstan, extruder, etc.

The unit is available with a large number of ratios of spur reduction delivering speeds from 110 r.p.m. to 0 to 5 r.p.m. to 0. It can be furnished with motors of almost all current specifications, open or totally enclosed.

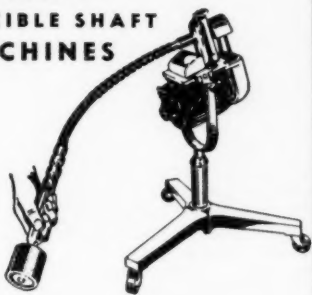
A typical small conveyor application of this unit is a belt conveyor carrying light parts in an assembly operation at speeds from 15 feet per minute to zero. The Model 20MT37 (37 denotes the ratio of the two stage spur gear reduction) connected to a 6" diameter head pulley through 3:1 chain reduction makes available a conveyor belt pull of 200 pounds at 15 feet per minute, increasing to 400 pounds pull at near zero speed. Higher conveyor speeds can be obtained by using less gear reduction in the transmission.

Made by Graham Transmissions, Inc., 3754 N. Holton St., Milwaukee 12, Wis.

75

# Elliott

## FLEXIBLE SHAFT MACHINES

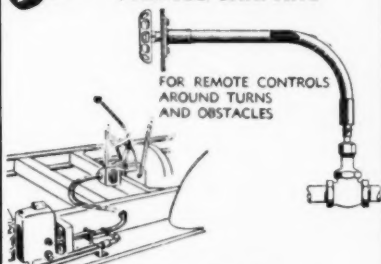


Over **22** high quality models to meet every industrial need *plus* a complete line of accessories.

All Elliott equipment is backed by over 50 years of experience and "know how" in flexible shaft manufacturing.

# Elliott

## FLEXIBLE SHAFTING



FOR POWER TAKE-OFFS TO ADJUSTABLE OR OUT-OF-LINE PARTS

Write for Catalog 49 on your Company Letterhead



# Elliott

## MANUFACTURING CO.

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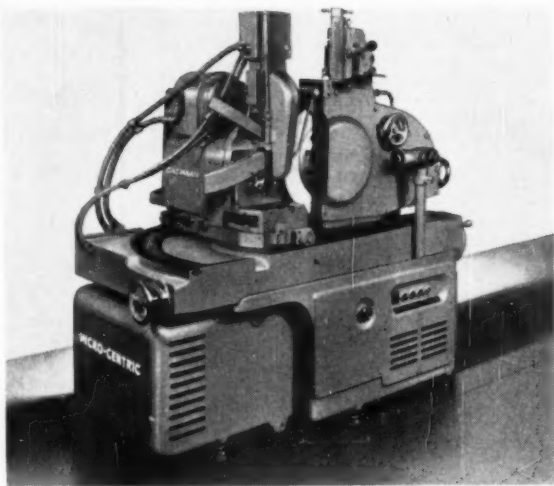
## CINCINNATI FILMATIC NOS. 1 AND 2 MICRO-CENTRIC GRINDING MACHINES

A new high production grinding machine with a new name—the Micro-Centric—has recently been developed by Cincinnati Grinders, Inc. This machine, designed primarily to meet the requirements of the precision anti-friction bearing industry, can also be used for numerous parts requiring similar standards of accuracy. Employing a new principle of work support and rotation, the machine will, without centers or a chuck, easily hold roundness well under 0.000025". The work is located, rotated and supported in such a manner that the ground diameter can also be held square with a pre-finished face well under 0.000025" accuracy.

The Micro-Centric grinders are made in two sizes, number 1 and number 2, and either can be built for full automatic operation or for hand loading. The No. 1 machine will grind work diameter from  $\frac{3}{4}$ " to  $3\frac{1}{2}$ " either automatic or hand loading, while the No. 2 machine will handle pieces from 2" to 4" diameter, automatic loading or 2" to 8" diameter when hand loading. Pieces above 4" diameter can usually be handled faster and more efficiently with hand loading than with automatic loading. One operator can feed two to four fully automatic machines or one to two hand loaded machines, depending upon the operation.

Fundamentally, Micro-Centric Grinders are built to handle work that has a large diameter in relation to the length.

The grinding wheel head pivots on a trunnion under wheel spindle, and is rocked forward into grinding position through a definite preset cycle. This cycle develops in four phases—Load, Rapid Advance, Feed and Dwell, Retraction and Unload. Each phase can be individually controlled; each is flexi-



ble and simple to adjust. A well-balanced combination of electrical and hydraulic controls insures rapid response and smooth action.

Rapid advance movement, regardless of workpiece diameter, can be varied from 0 to  $1\frac{3}{4}$ " and the infeed movement from 0 to  $\frac{3}{8}$ ". This amount of movement provides ample clearance around the headstock when loading by hand and also allows "air grinding" to be reduced to a minimum when grinding fully automatic.

Depending on the material to be ground and quality of finish required, the combined infeed and tarry time can be varied, by means of an electrical time delay relay, from 3 to 60 seconds. For the same reasons, the infeed rate of grinding can be varied from a low of 0.005" per minute to a high of 1" per minute.

The grinding wheel on the No. 1 machine is driven by a 3 h.p. motor and on No. 2 machine by a  $7\frac{1}{2}$  h.p. motor. Headstock spindles on both machines are powered by  $\frac{3}{4}$  h.p. motors, while the hydraulic pumps are powered by 1 h.p. motors. Made by: Cincinnati Grinders, Inc., Cincinnati 9, O. 76

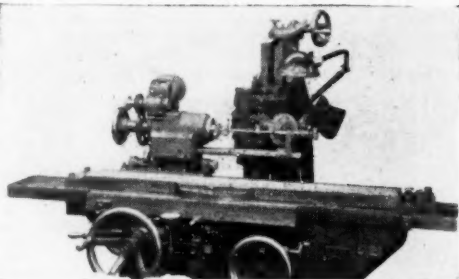
## THE SPI-RAD SPIRAL AND RADIAL RELIEVING FIXTURE

A recently introduced device which is claimed by its manufacturers to be the first "on center" spiral and radial relieving fixture, has been introduced by Glenbard Tool Manufacturers, Inc. The device, known as the "Spi-Rad," can be fitted to any universal tool grinding machine; it can be mounted by one person and is so simple to use that non-skilled personnel can operate it. It is further stated to be easily adjustable to all precision cutting-tool needs and problems, some not heretofore possible.

The Spi-Rad has been proven in tests to reproduce the exact form on the wheel. It can do intricate tool work which has never before been possible by spiral and radial relief machines and totally impossible by angular relief machines. It is claimed to improve precision cutting tools by at least 500%. It cuts down time and improves over-all machine tool production a minimum of 25% time per man per day.

The new relieving fixture, according to its manufacturers, will grind every conceivable type of spiral and radial relieved cutting tool possible, without limitations on the types or shapes of end-cutting contours that can be reproduced. Tools which have been machined on the Spi-Rad are claimed never to leave center; the tool wears evenly at all points at all times.

The components of the device include a base which is mounted on the main body, to which is attached the back plate mechanism that contains the cam assembly which gives the fixture helical or spiral motion. On the stud on which the cam is mounted is also mounted one of the change gears which gives the re-



quired indexing. This main body has a tapered spindle mounted in bronze bearings. On the back side of the main body is a sine bar which is adjustable to give the required amount of radial relief. On the left side of the base, a sine bar is mounted which is adjustable to give the required helical or spiral relief.

In operation, the back geared motor drives the spindle gear, which in turn drives the cam and indexing gear. With each rotation of the cam, the machine is energized forward and can be adjusted by the back sine bar to give the required amount of spiral relief. By adjusting the side sine bar, the amount of radial relief can be determined and controlled. For instance, having the proper gears for a four-fluted tool, the cam repeats this cycle four times to each revolution of the spindle.

The "Spi-Rad" relieving fixture is manufactured by Glenbard Tool Manufacturers, Inc., 216 N. Clinton St., Chicago 6, Ill. 77



The only self locking chuck. More rigidity too. Simple construction. No protruding parts. Only \$48.00

### SMITH BORING CHUCKS

Tool Room set includes 1A chuck, aluminum case, 4 boring tools and wrench with handle.



No. 1A small enough to fit in your pocket yet adaptable to any boring job. Bore and face with same chuck. Only \$15.00. Order today. Descriptive literature sent on request.

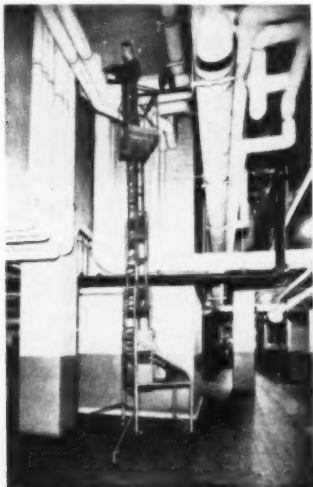
**Smith**

**BORING CHUCK COMPANY**

99 GARDNER ST., MANCHESTER, CONN.

### ELECTRICAL EXTENSION SCAFFOLD

Atlas Industrial Corporation, announces the introduction of a new electrically operated Extension Scaffold. With this simple to use scaffold, workmen can reach a height up to 26 feet.



The electrically operated scaffold is easy to handle. Roller bearing swivel casters on all four legs make it easy to maneuver in tight places. It may be extended to any desired height. The sturdy welded steel safety rail is stored within the U frame, making the Electrically Operated Scaffold a very compact unit. Atlas Industrial Corp., 849 39th St., Brooklyn 32, N. Y.

78

### SMALL-LOT VARIABLE SPEED TUMBLING BARRELS

Speed and convenience in deburring small lots of stampings, die castings and similar pieces are accomplished by new variable speed small-lot tumbling barrels recently announced by Belke Manufacturing Company. These units are also stated to be useful for test runs to determine correct rotating speed, the kind and size of abrasive, the most effective load size and other factors which are essential to efficient finishing of parts.

The unit can be mounted on a bench or small stand. The barrel is rotated by an enclosed, variable speed drive which permits simple adjustment to any rotat-

ing speed between 13 and 39 r.p.m. Two sliding trays, the top one of which is perforated, permit quick separation of the work from the media.

These small-lot deburring barrels are available in two sizes. The total capacity of Model 2 is 0.4 cubic feet; of Model 3, 2.0 cubic feet. Made by Belke Manufacturing Co., 947-49 N. Cicero Ave., Chicago 51, Ill.

79

### NEW STOW FLEXIBLE SHAFT MACHINES

Two new power units—the Jiffy Tool and the Speed Jiffy have been developed by the Stow Manufacturing Co. These portable machines are said to be ideal for machine shops and industrial plants. Both can be used for polishing, routing, brushing, grinding, buffing, drilling, filing, sanding and a variety of other jobs.

The Stow Jiffy Tool (upper) is a 3-caster floor model, delivering  $\frac{1}{4}$  h.p. at 1750 r.p.m. through a 5' flexible shaft. The motor unit operates on a 110 volt, 60 cycle, single phase a.c. lighting line. Both  $\frac{1}{3}$  and  $\frac{1}{2}$  h.p. units also are available.



For more complex operations, Stow offers the Speed Jiffy (lower, in picture) which has three speed variations, 1000, 1750 and 3000 r.p.m. These velocities are obtained merely by altering the plug-in position of the flexible drive shaft. The Speed Jiffy also features an automatic tensioning belt, with no adjustments in the belt necessary. Made by Stow Manufacturing Co., Binghamton, N. Y.

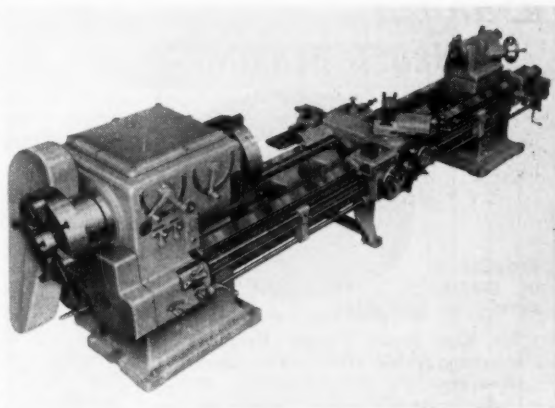
80

## NEW 20" LeBLOND OIL COUNTRY LATHE

A new hollow spindle lathe with a 9" bore is announced by the R. K. LeBlond Machine Tool Co. Rated as a 20" size, the new lathe will swing 27" over bed and carriage wings; it is available with center distances starting at 48", has an 18-speed geared headstock, and is arranged for 20 h.p. main drive motor.

The 18 spindle speeds range from 10 to 362 r.p.m. An electric brake with apron spindle control is said to be the most modern and efficient arrangement for starting, stopping and reversing the spindle. This device makes spindle response faster, therefore saves valuable operating time.

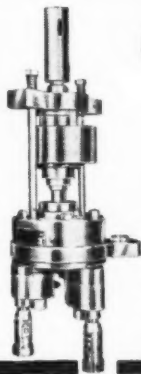
In addition, the quick change feed box is totally enclosed, automatically lubricated, and offers 63 feed and thread changes. Other advantages of the new unit include hardened and ground steel bed ways front and rear, a one-piece



apron with positive jaw feed clutch, thrust lock tailstock, and others.

For additional information, send for bulletin HS-111 to The R. K. LeBlond Machine Tool Co., Cincinnati 8, Ohio.

81



## Only ERRINGTON Adjustable TAPPING HEAD

**Offers So Many Advantages**

Sizes  $\frac{1}{8}$  0 -  $\frac{1}{2}$  10 Tap to 5/16"  
 $\frac{1}{8}$  1 - 3/16" Tap to  $\frac{1}{2}$ "  
No. Spindles: 2 to 6

Here's a versatile tool which permits you to take advantage of a wide range of adjustment — without overhang. Supplied with 3 spindles for equal adjustment in line and 3, 4, 5 or 6 spindles for equal adjustment on bolt circles.

Write for Complete Information

- Fully geared
- Needle bearings on all spindles in head
- Ball thrust bearings throughout
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- Sand cast aluminum case
- All parts fully enclosed for pressure lubrication and protection
- Non-slip positive clamping on all adjusting members



## *Banded* **THRUST BEARINGS**



REGULAR  
OR SPECIAL  
DESIGN TO 24" O.D.

We also make Thrust Bearings interchangeable with other manufacturers.

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Cap Screws • Set Screws  
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when you know

## WHO\*

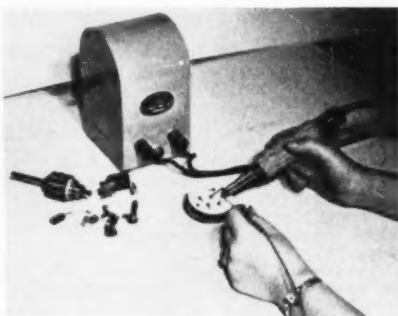
has been making the finest  
for over half a century.

\*WHO is...  
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YORK, PENNA.

Send for Free Literature.

## NEW MIDGET SOLDERING TOOL

The Mighty Midget Soldering Tool is designed for use on the production line or for maintenance and repair work. It provides a high production soldering tool for work on fractional horse power motors, radio and television assemblies, as well as all other types of light weight soldering applications.



Operating on the resistance heating principle, this tool will accommodate three different sizes of soldering electrodes: 3/32", 1/8, and 5/32" dia. in either the single or double contact type construction. Soldering heat is instantaneous with no warm-up period required. The soldering tool is ready for immediate use upon turning on the primary switch.

The construction of this tool permits it to be connected to any convenient a.c. outlet of proper voltage and cycle. No special wiring is required. The energizing current is less than 10 watts.

The Soldering electrodes are equipped with cork grip handles for ease of handling. Electrodes are extremely light in weight. Standard length of cable for soldering electrode is five feet. The No. 551 unit delivers 270 watts on a continuous basis providing ample capacity for two operators per unit with no power loss. It is equipped with six-foot primary lead cable, primary switch and red signal light for Off and On indication. It is furnished for operation on 115 or 230 volt 60 cycle a.c. current. Made by Luma Electric Equipment Co., Toledo 1, Ohio.

82

## SAVE ON PALLEY WAR SURPLUS MACHINE TOOLS

**JUST RECEIVED!! - \$600,000 INVENTORY OF STAPS, DRILLS, CUTTING TOOLS, MILLING CUTTERS, METAL SAWS, ETC. - NEW!!**

We've made a terrific buy and we're passing the savings on to YOU!! ALL these tools are NEW - in Perfect Condition - NO SECONDS - NO REJECTS, at PRICES THAT MEAN SAVINGS UP TO 85%. Many are well known makes such as Union, Morse, National, Goddard & Goddard, Cleveland, Pratt & Whitney, Whitman & Barnes, Scully-Jones, Armstrong, Thurston, Brown & Sharpe, and others. Order now while we've got 'em at these BIG DISCOUNTS - They won't last long.



**1950 CATALOG**  
Just off the presses.  
Loaded with machine tools, pumps, hydraulics, etc. send for it. **Ends 11**



**New Double Acting HYDRAULIC CYLINDERS**

51 Types, shapes. 1001 Labor Saving Adaptations for Pushing, Pulling, Lifting. Finest Precision Work, Materials. All Accessories, Fittings, Valves, Pumps.

**Vickers Hydraulic Transmission**

Self contained. 2 H. P. constant torque at all speeds with variable volume reversible, piston pump (controlled by outside lever) supplying piston hydraulic motor. Automatic pressure, dash pot for smooth control. Power output R. P. M. 0 to 1/2 input R. P. M. 1800 continuous 4000 intermittent. Dash pot can be removed for greater R. P. M. Ideal for Lathes, Duplicator Setup on Mills, Conveyors, Small Cars, Drives, Gearing, Etc.

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We stock Aluminum, Magnesium, Brass, Copper, Steel in sheets, Bar Tubing and Angles, Plexiglass, Lucite, Phenolic, A & N Fittings, Rivets, Bolts, Nuts, Aircraft Supplies. Just arrived - 5,000 lbs. of 1/4" and 5/16" Plexiglass in full sheets of 1/8" Nescelite Plastic.

### PNEUMATIC DRILLS/TOOLS & RIVET GUNS

**AIR DRILLS OR MOTOR SPECIAL**

with 1/2" JCB Chuck

**\$17.50**

Also Nut Runners  
Screwdrivers  
Squeezers  
Angle Drills, Etc.  
Popular Makes

**RIVET GUNS**  
Pistol & Gooseneck Type

± 181  
E3. E2. 3X. Pistol  
2X. QY. \$55 Val.

**\$8.95**

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**PALLEY SUPPLY CO.** DIVISION 6321 SAN FERNANDO RD. "T"-12 GLENDALE 1, CALIFORNIA

### TRAMMEL HEADS MAKE FOUR-IN-ONE TOOL

The Engineering Research Associates have just announced the development of their new ERA Trammel Heads. With any combination square or scale, these heads make an accurate compass, height gauge, inside calipers, outside calipers and scribe.

The manufacturer states that the Trammel Heads have scores of other uses.

Every set of ERA Trammel Heads comes complete with scribe paints, pencil tip and special caliper paints. Made by Engineering Research Associates, 3475 East Nine-Mile Road, Hazel Park, Mich.

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### TUKON MICROHARDNESS TESTER

Model MO, a new Tukon Microhardness Tester, has been introduced by Wilson Mechanical Instrument Company, Inc., an Associate Company of American Chain & Cable Company, Inc., New York.

Mechanically operated, it is recommended for light load testing where there is not sufficient testing to warrant a fully automatic model. The MO is accurate and easy to operate. It is made in both a floor and bench model. It



applies loads of from 1 to 1000 grams and may be used with either the knoop or 136 degree Diamond Pyramid Indenters. Load is applied under dash pot control, speed of which may be varied from less than .040" per minute, to as fast as testing permits, without impact influencing the results. Both rate of application and duration of applied load may be controlled. An outstanding feature of this model is an arrangement for removing the load without the operator having to touch the instrument until indenter is out of impression.

Focusing the impression under the microscope is accomplished through the elevating unit with vernier adjustment. This eliminates the need for coarse and fine adjustment on the microscope. The load is applied in a novel manner which eliminates the necessity of bringing the elevating screw to any reference marks, trial settings, etc. The Microton (a specially designed mechanical stage for making indentations in selected small areas)

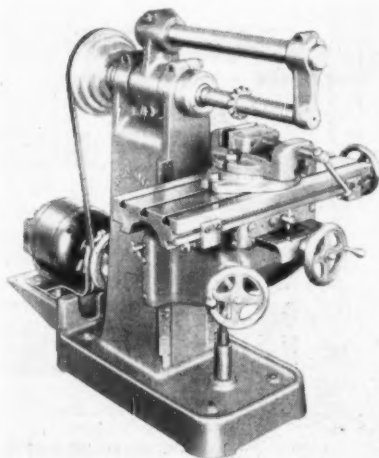
is used for accurately locating the indentations. The Tukon Microhardness Tester is made by Wilson Mechanical Instrument Co., 230 Park Ave., New York 17, N. Y. 84

### IMPROVED BENCHMARK MILLING MACHINE

The Benchmark Miller, which can be used interchangeably as both a horizontal and vertical mill by substituting spindle assemblies, has recently been improved by the addition of a telescopic vertical screw operated by steel miter gears.

The new telescopic screw permits the miller to be used on any bench or stand without drilling the table top for the screw to extend beneath. The large miter gears operating the new telescopic section assure greater smoothness and ease of operation on vertical adjustments. The Benchmark has a 6" x 18" table with a longitudinal travel of 12½". Transverse feed is 5½" and vertical travel is 8½".

As it is provided with Timken Tapered Roller Spindle Bearings, with high load capacity, the Benchmark is suitable for both low and high speed operations. Be-



sides milling both vertically and horizontally, attachments are available for the Benchmark for turning, grinding and drilling operations. Descriptive circulars are available upon request. Write: Benchmark Manufacturing Co., 2952 West Pico Blvd., Los Angeles 6, Calif. 85

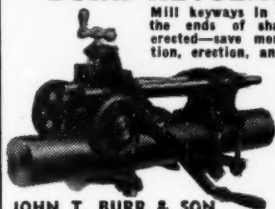
# CAMS

Our ROWBOTTOM cam cutting facilities are at your disposal for your cam requirements.

We solicit your inquiries.

**BLOOMFIELD TOOL CORP.**  
36 FARRAND ST. BLOOMFIELD, N. J.

## BURR KEYSEATERS



Mill keyways in the run or on the ends of shafting already erected—save money on alteration, erection, and repair work.

Made in 4 sizes, for hand or motor operation.

Write for Bulletin and prices.

**JOHN T. BURR & SON**  
429 Kent Ave.,

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Produced by Nature.....**GRANITE**  
Perfect by **SURFACE**  
Herman Stone.....**PLATES**

**Durable • Accurate • Economical**

The inherent hardness and durability of granite, accurately finished to a guaranteed tolerance of .00005", provide the most efficient and economical surface plates for precision measurement operations. Sizes up to 8' x 16'.

★ Non-Magnetic ★ Can Not Warp

★ Corrosion-proof

Write for Free Trial Offer

**THE HERMAN STONE COMPANY**

324 Harries Bldg. • Dayton 2, Ohio

## NEW! INDEXING FIXTURE



Here is a new G & H fixture which can be used horizontally or vertically. . . . speeds precision machining. 2, 3, 4, 6, 8, 12 and 24 indexes set on

one index plate. Capacity 0 to 1/2". Write for full details.

**G & H MFG. CO.**

327 ELM STREET, FITCHBURG, MASS.



## ABRASIVE CENT-R-LAP TOOL

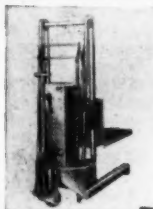
Saves time, eliminates diamond dressing. Cones changed in seconds. Available in 2 sizes 1/2" and 3/4" Cent-R-Laps and abrasive Cones.

Write for descriptive literature and prices.

**J. R. Reich Manufacturing Co.**  
45 E. Stroop Rd. Dayton 9, Ohio

## LYON — Raymond HYDRAULIC

High-Lift Trucks



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## USE ECONOMY — DERIVE ECONOMY



**SOCKET HEAD  
CAP SCREWS**

**MILLED  
FROM BAR**



**HOLLOW  
SET SCREWS**

**MADE OF  
ALLOY STEEL**

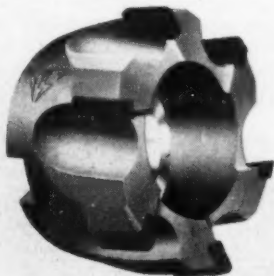


**ECONOMY MACHINE PROD. CO., 5207 Lawrence Ave., Chicago 30, Ill.**

### WENDT-SONIS SHELL END MILL

A new type of shell end mill has been introduced; it is designed for facing or milling to a shoulder and will operate at higher feeds and speeds.

The new tool has more teeth in the cutters, permitting increased table feed per minute and freedom of cutting action. The cutters are designed with sufficient flute capacity for proper chip removal plus a contour that creates the correct chip formation.



Tools wear evenly because of the uniform blend of carbide used for the inserts. The carbide insert overhang prevents the diamond wheel from touching the steel body when cutter is sharpened. An ample carbide insert allows for maximum regrinds and depth of cut. Heavy, stress-relieved bodies of special heat-treated alloy steel provide rigidity and prevent vibration at high speeds.

These shell end mills are available in sizes ranging from 1½" to 6". Made by Wendt-Sonis Company, Hannibal, Mo.

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### NEW MASTER AIR VALVE HAS WIDE APPLICATION

Airmatic Valve, Inc., announces a new, compact type Master Air and Low Pressure Hydraulic Valve with built-in full capacity flow control meters of the Venturi type.

The one-piece balanced spool uses aircraft packing which eliminates metal-to-metal contact between wearing parts. By simply replacing the "O ring" packing renews the valve. This design permits full line volume without any loss of pressure and operation is not affected by line pressure variation.

The Master Valve can be close-coupled to the cylinder, effecting air-savings, thereby increasing the speed of operation. In many cases, this method will reduce the overall cost of pipe installation, the manufacturers say.

The Airmatic Model MV-4-375 Valve can be used in conjunction with pilot valves to provide automatic and semi-automatic operations, sequence of operation and also remote control paneling. The design is offered in four standard pipe sizes: ¼", ⅜", ½" and ¾". Made by Airmatic Valve, Inc., 1643 E. 40th St., Cleveland, Ohio.

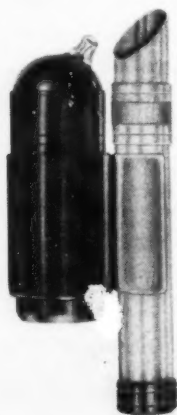
87

### POCKET MICROSCOPE WITH ILLUMINATOR

Buhl Optical Company has announced a special illuminator for use with its S-129 Pocket Microscope. The microscope, having selective magnification ranging from 40 to 60 power, is widely used in industry for inspecting raw materials as well as cast, machined, and finished surfaces of all kinds.

Although the Buhl Pocket Microscope is designed for use with normal room lighting, some applications have required its use in dark, inaccessible places. The new illuminator answers this purpose.

Using a standard-size flashlight battery and bulb, the illuminator directs an oblique beam of light on the observed surface, furnishing illumination of uniform intensity throughout the field. It is



attached to the microscope tube by means of a heavy spring clip and can be removed instantly when not required.

A complete, self-contained unit, the illuminator is compact and easy to handle. Turned from aluminum, the case is lightweight yet rugged.

Made by Buhl Optical Co., Desk T-126, 1009 Beech Ave., Pittsburgh 12, Pa.

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**New** NESTING TYPE  
**TOTE PANS**

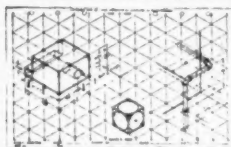
20" Long x 12"  
Wide x 6 1/4" Deep  
16 Ga., drag holes,  
handles both ends.



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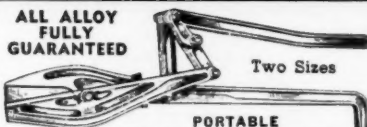
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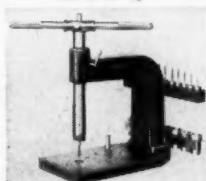
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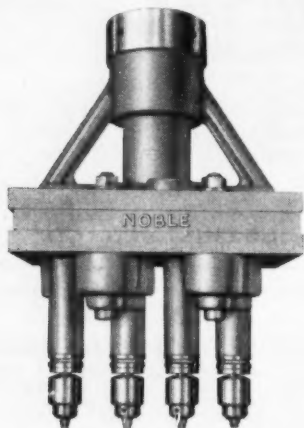
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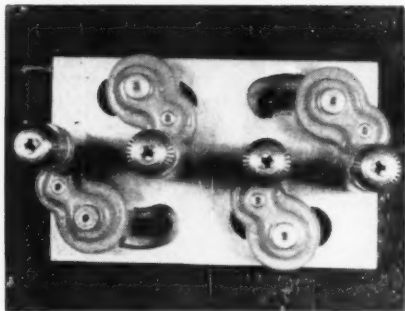


## NOBLE MULTIPLE SPINDLE DRILLING HEAD

An ingenious multiple spindle drilling head which is adjustable both to straight lines and in radial patterns has recently been developed by Noble Machine Tool Co. The new unit, designated as Type MS4, is provided with four spindles, assembled in pairs on the sides of two driving gears in the head housing. The drilling head is shown in standard operating position in the illustration below.



The four spindles ride in slots in order that lateral adjustment may be obtained. The spindles will also swing on their slot-mounted centers for a secondary adjustment independent of the first.



The set-up can be locked either in a straight line, as indicated in the diagram below, or grouped in a radial pattern; the spindles may be placed in a straight line at a minimum distance of  $1\frac{1}{4}$ " between adjacent spindles, or at a maximum distance between the two outside spindles of  $9\frac{1}{4}$ ".

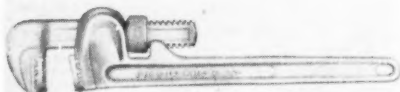
The minimum radial adjustment of the spindles is  $1\frac{7}{8}$ " apart, and the maximum is 7". The maximum rectangle is  $5\frac{1}{2}$ " x  $8\frac{1}{2}$ ". The maximum distance between the two outside spindles is  $10\frac{1}{2}$ ". This wide range of settings is useful for the varied set-ups which are constantly required.

Each spindle is equipped with a chuck which will take drills up to  $7/16$ ". The overall height of the new drill head is 9". It is made by Noble Machine Tool Co., 222 East St., Pawtucket, R. I. 89

## WILLIAMS ALUMINUM PIPE WRENCH

Williams Aluminum Pipe Wrenches are fully drop-forged from special high tensile aluminum alloy, heat-treated for maximum strength and toughness.

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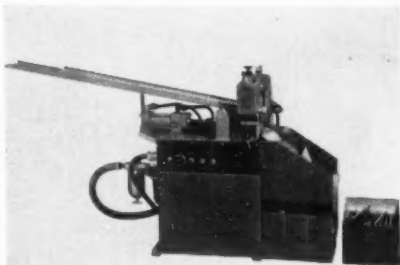


steel wrenches. They will withstand the abuse and severe usage associated with this type of wrench over years of service, according to the manufacturers.

Replaceable alloy steel jaw inserts are interchangeable. The same insert fits handle or movable jaw. Multiple dovetail design and retaining screw assure easy assembly and firm anchorage. Inserts are cadmium-plated. The steel adjusting nut is case-hardened, knurled for easy adjustment and cadmium-plated. The movable jaw is suspended between two springs of unique design. Gripping action is immediate and positive. Made by J. H. Williams & Co., 400 Vulcan St., Buffalo 7, N. Y. 90

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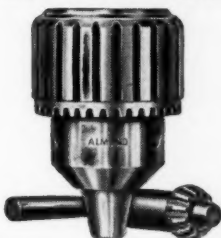
These machines can be made to meet individual needs for volume of product. They can be manual loading and disposal; manual loading and automatic disposal; automatic loading and automatic disposal.

The machines are able to segregate a product into any number of categories and each category can be of any dimensional "width".

The machine illustrated above gages and sorts straight sleeves, measuring for length and diameter at both ends. The sleeves are measured into four categories: (1) Oversize and undersize in length regardless of diameter. (2) Small in diameter at either or both ends. (3) Either or both ends large in diameter. (4) Good sleeves, with tolerance. This machine has a production rate of approximately 3000 per hour. The capacity is adjustable for different lengths and diameters. It is loaded manually, automatic disposal. Made by **Brown & Sharpe Mfg. Co., Providence 1, R. I.** 91

The appointment of S. A. Press as general sales manager of Swan-Finch Oil Corporation, New York, was announced by Howard F. Moncrieff, Swan-Finch president.

## ALMOND DRILL CHUCKS

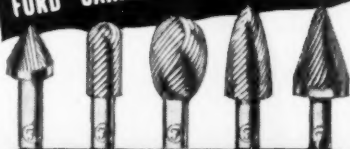


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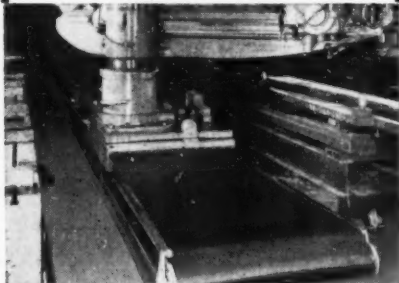
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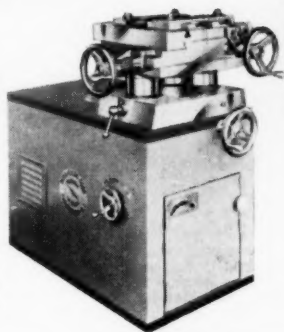
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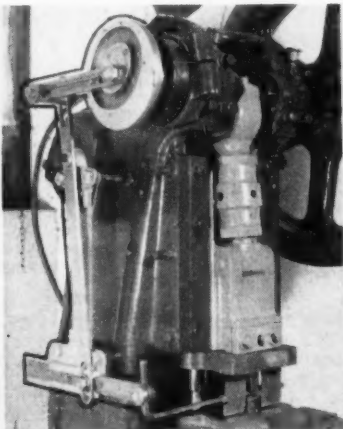
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market, and several have been installed that have given satisfactory results, according to the manufacturers. The de-



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Air Reduction, manufacturers of industrial gases and welding equipment, has announced the Airco No. 75 Air-Acetylene Outfit for small soldering, low-temperature brazing, heating or lead-burning jobs.

The outfit is furnished with the following four tips. (1) Radiator Soldering Tip—slender tubing permits the flame to be used in confined places. (2) No. 9



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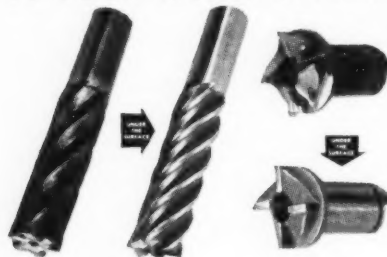


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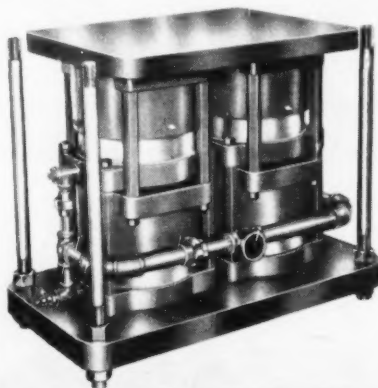
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The torch assembly, ruggedly constructed of brass, with five feet of 3/16" flexible hose, a soldering iron and soldering copper complete the outfit.

Typical uses for the Airco No. 75 Air-Acetylene Outfit are for joining solder-type fitting for copper installations; for soldering hard-to-reach electrical connections and in the repair of radiators and batteries. Descriptive folder (Form No. ADG-2043) is available upon request. Air Reduction Sales Co., 60 East 42nd St., New York 17, N. Y. 94

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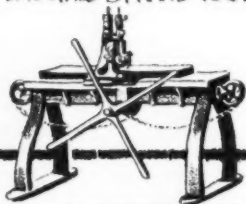
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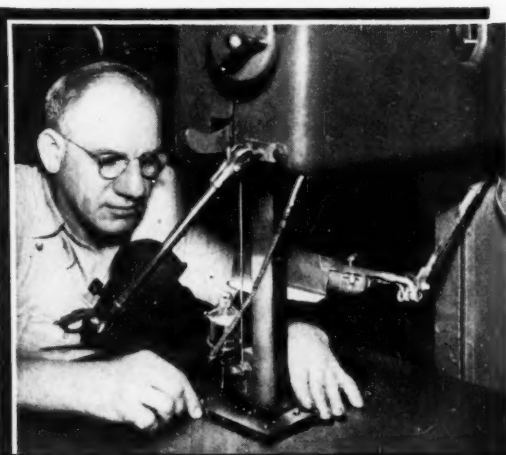
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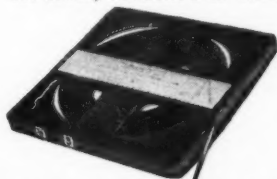
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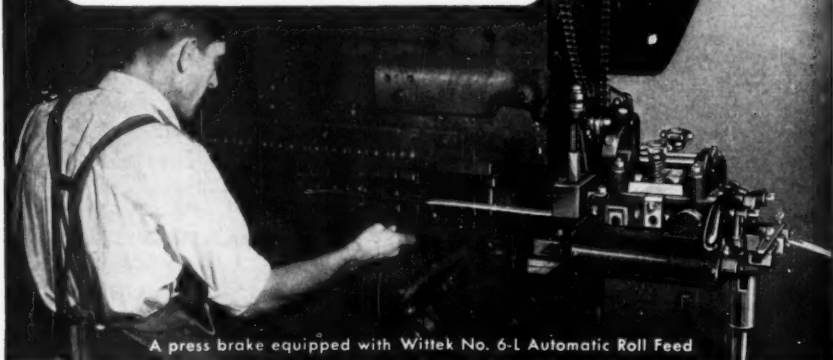
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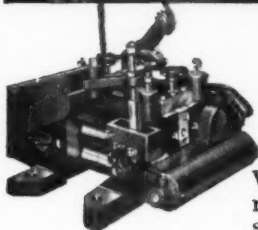
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9/32" .....	1.30	11/16" .....	2.50	1- 3/16" .....	5.50
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11/32" .....	1.50	3/4" .....	2.70	1- 5/16" .....	6.50
3/8" .....	1.50	25/32" .....	2.90	1- 3/8" .....	7.50
13/32" .....	1.70	13/16" .....	2.90	1- 7/16" .....	8.20
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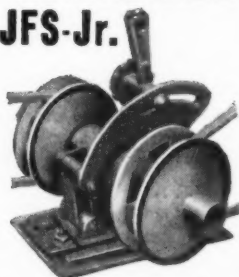
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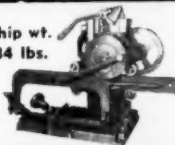
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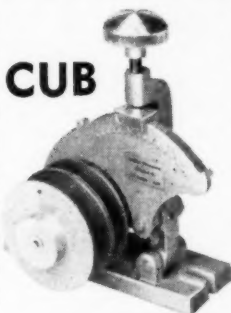
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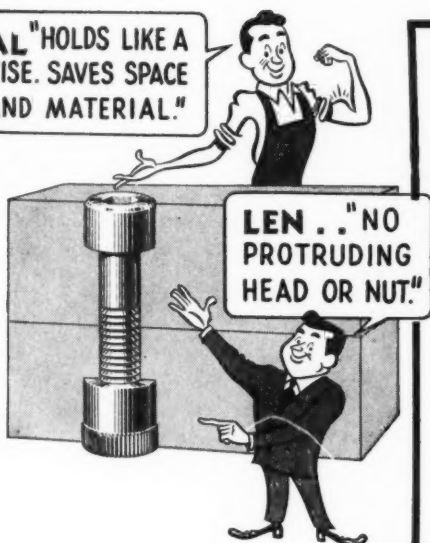
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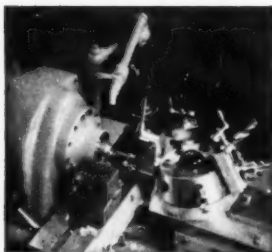


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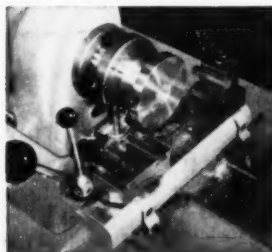
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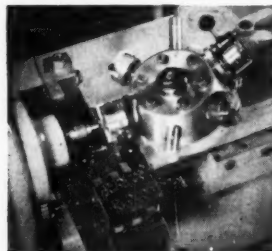
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